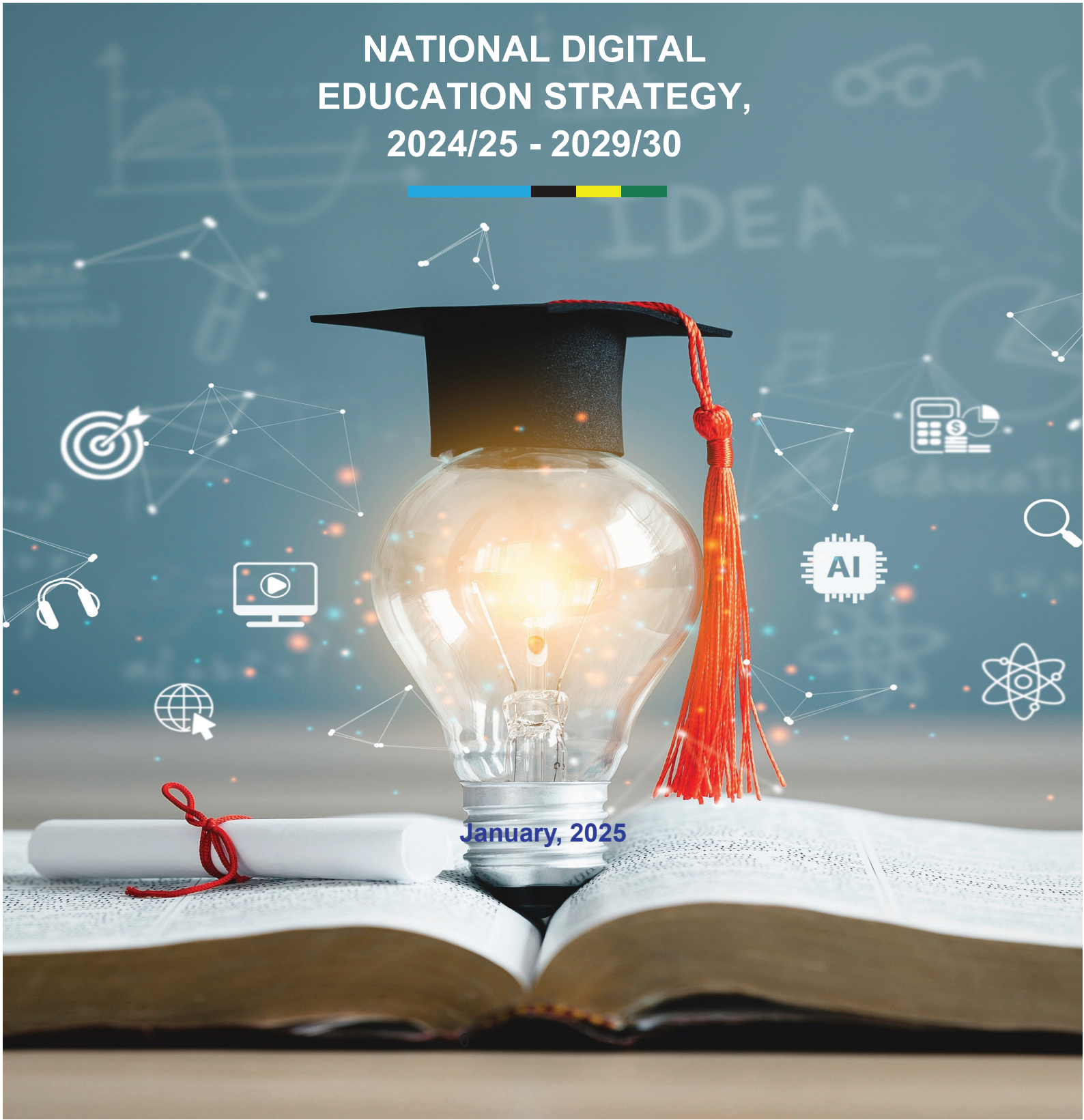
THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

NATIONAL DIGITAL EDUCATION STRATEGY, 2024/25 - 2029/30



January, 2025

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Table of Contents

List of Tables

List of Figures

ABBREVIATIONS

AI	Artificial Intelligence
BEMIS	Basic Education Management Information System
CBM	Conveyor Belt Marking
eGA	e-Government Authority
EMIS	Education Management Information System
ESDP	Education Sector Development Plan
ETP	Education and Training Policy
FDC	Folk Development College
IAE	Institute of Adult Education
ICT	Information and Communication Technology
ICT CFT	Information and Communication Technology Competency Framework for Teachers
HEET	Higher Education Economic Transformation
LAN	Local Area Network
LGA	Local Government Authority
LMS	Learning Management System
MEL	Monitoring
MDAs	Ministries
MoCIT	Ministry of Information
MoEST	Ministry of Education, Science and Technology
MoWTC	Ministry of Works, Transport and Communications
NACTE	National Council for Technical Education
NF-TCPD	National Framework for Teacher Continuous Professional Development
ODeL	Open Distance e-Learning
OER	Open Educational Resources
PO-PSM	President's Office, Public Service Management and Good Governance
PO-RALG	President's Office, Regional Administration and Local Government
PReM	Primary Record Manager
PReMS	Primary Record Manager for Secondary
QA	Quality Assurance
SEQUIP	Secondary Education Quality Improvement Project

SIS	School Information System
TCPD	Teacher Continuous Professional Development
TIE	Tanzania Institute of Education
UNESCO	United Nations Educational, Scientific and Cultural Organization
MOOCs	Massive Open Online Courses

GLOSSARY

Classroom	Both virtual and/or physical environment where classes can be conducted in education settings.
Digital Content	Any content materials presented in digital forms such as, including audio, video, images, books, articles, dictionaries, and educational courses, among others.
Digital Facility	The infrastructure, tools and technologies that can be used to facilitate the integration of ICT in education and training
Digital Technology	Resource that are used to support teaching and learning.
Educator	A person who provides instruction or education, namely, a teacher, instructor, tutor, lecturer, or professor.
Education Institution	A place where people of different ages gain an education, including preschools, primary schools, ordinary and higher secondary schools, colleges, and universities.
Emerging Technology	Technologies that are currently developing, or that are expected to be available within the next five to ten years, and is usually reserved for technologies that are creating, or are expected to create, significant social or economic effects.
EMIS	A system for the collection, integration, processing, maintenance and dissemination of data and information to support decision-making, policy analysis and formulation, planning, monitoring and management at all levels of an education system.
e-Waste	Electronic products that are unwanted, not working, and nearing or at the end of their “useful life.”
ICT Infrastructure	Any physical equipment and/or software necessary to implement and operate systems and networks for communication services, support applications, digital content, and e-commerce.
ICT Integration	The extent to which information and communication technologies have been adopted into the learning environment and the degree of impact on the physical and/or virtual classroom pedagogies.

Key Performance Indicators	Indicators that can be computed and utilized for evaluating an educational system at various levels, using the data available in the education statistics data bank. These indicators constitute an important component of a management information system
Learner	A pupil, student or an individual who is engaged in the process of learning new skills and knowledge in an education institution.
Learning Platform	Information systems that schools, colleges, institutions, and universities, can use for teaching and learning.
Massive Open Online Course	An online course designed for a large number of participants. It can be accessed by any registered participant located anywhere using Internet connection
Pillar	A main area of focus of the strategy that could be core, which ensure technology transforms education effectively and equitably across all levels.

FOREWORD

The Government of Tanzania recognizes the importance of Information and Communication Technology (ICT) for improved access, inclusiveness, equity, quality and relevance of education. In our interconnected world, knowledge and information are becoming essential for the development of a society, as is the ability to communicate. A key piece of this is for citizens to harness the strengths, and mitigate the pitfalls of digital tools. As a nation, we are obliged to prepare our children and society as a whole to benefit from and contribute to our country's social economic development in the information age. We must therefore prepare them to take advantage of the full range of ICT, from radio, TVs, smartphones, tablets, computers, and smart classrooms to the Internet and AI, to build the foundation for a well-educated and learning knowledge society.

The Government has developed the National Digital Education Strategy for Tanzanian Schools, Colleges and universities to enable the integration of ICT in the respective levels of education in the country. The Strategy is guided by the overall objectives of national policies, including the Tanzania National ICT Policy of 2016 and the Education and Training Policy 2014 version 2023. Also, its benefits will be achieved through the concrete strategies and collaboration of all relevant stakeholders. This is the reason we consulted a wide range of stakeholders in the course of developing the Strategy.

The Strategy acts as a guide for all levels of education while involving our communities, investors, implementers and all key partners and beneficiaries in the sector. It gives a snapshot of what is required for the integration of ICT in education to have an impact on reducing the digital divide and improving curriculum delivery for better learning outcome achievement. We hope that the Strategy provides a proper framework to all stakeholders shall harness the power of ICT integration in education in Tanzania.

Prof. Carolyne I. Nombo
PERMANENT SECRETARY

EXECUTIVE SUMMARY

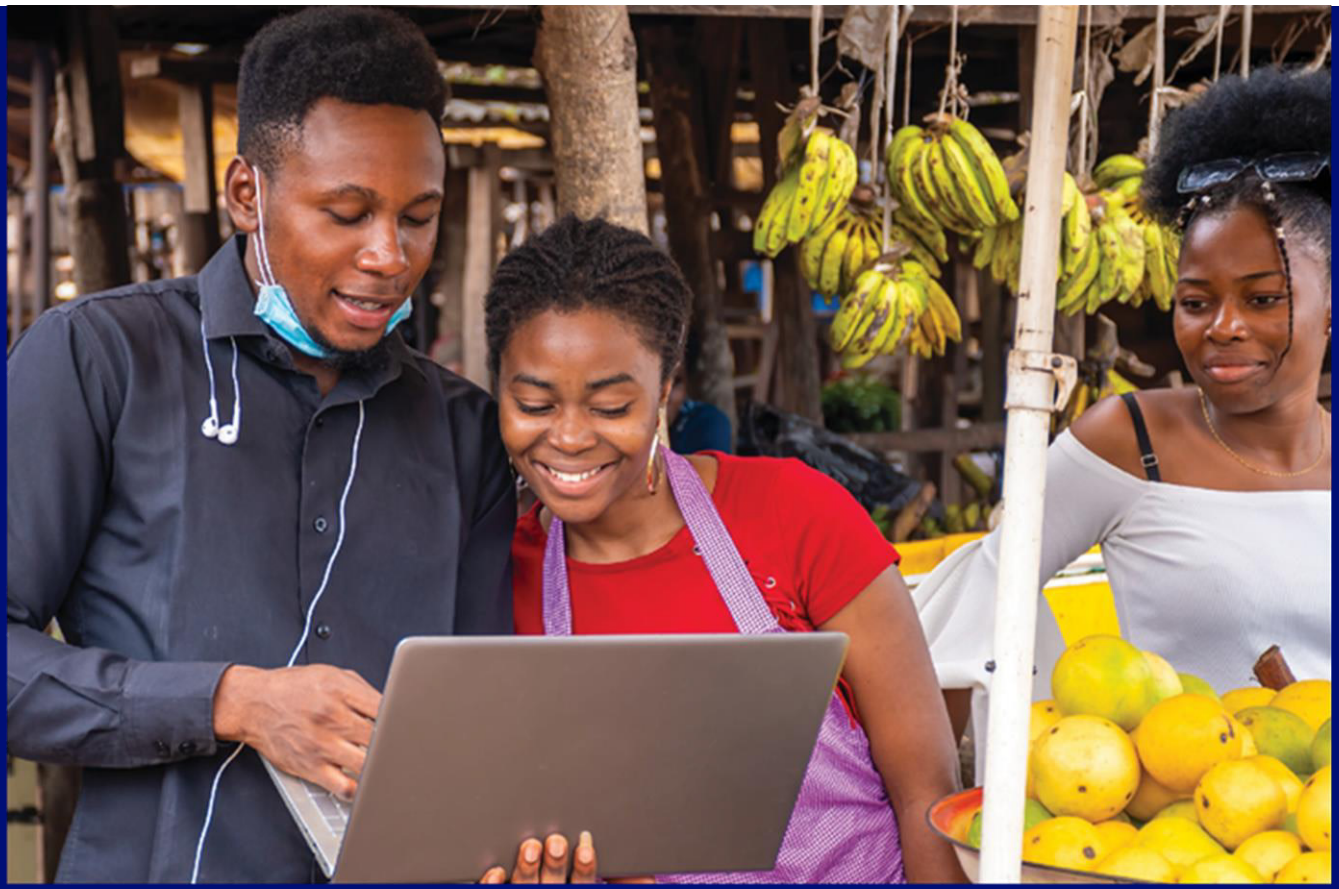
The Government of the United Republic of Tanzania set out its Vision 2025 with the last part expressed in a five-year development plan for 2020-2025 as well as the overarching National Information and Communication Technology (ICT) Policy 2016 and the Education Policy and Training 2014 version 2023 all emphasising the importance of using ICT in improving education in Tanzania. The Tanzania's National Digital Education Strategy is a comprehensive plan that aims to integrate ICT into all levels of education to improve the quality of teaching and learning in the country. It outlines how ICT should be adopted and utilised to improve education and training across all levels. This Strategy is prepared by the Ministry of Education, Science and Technology (MoEST) in collaboration with stakeholders from the public and private sectors, the civil society community and development partners.

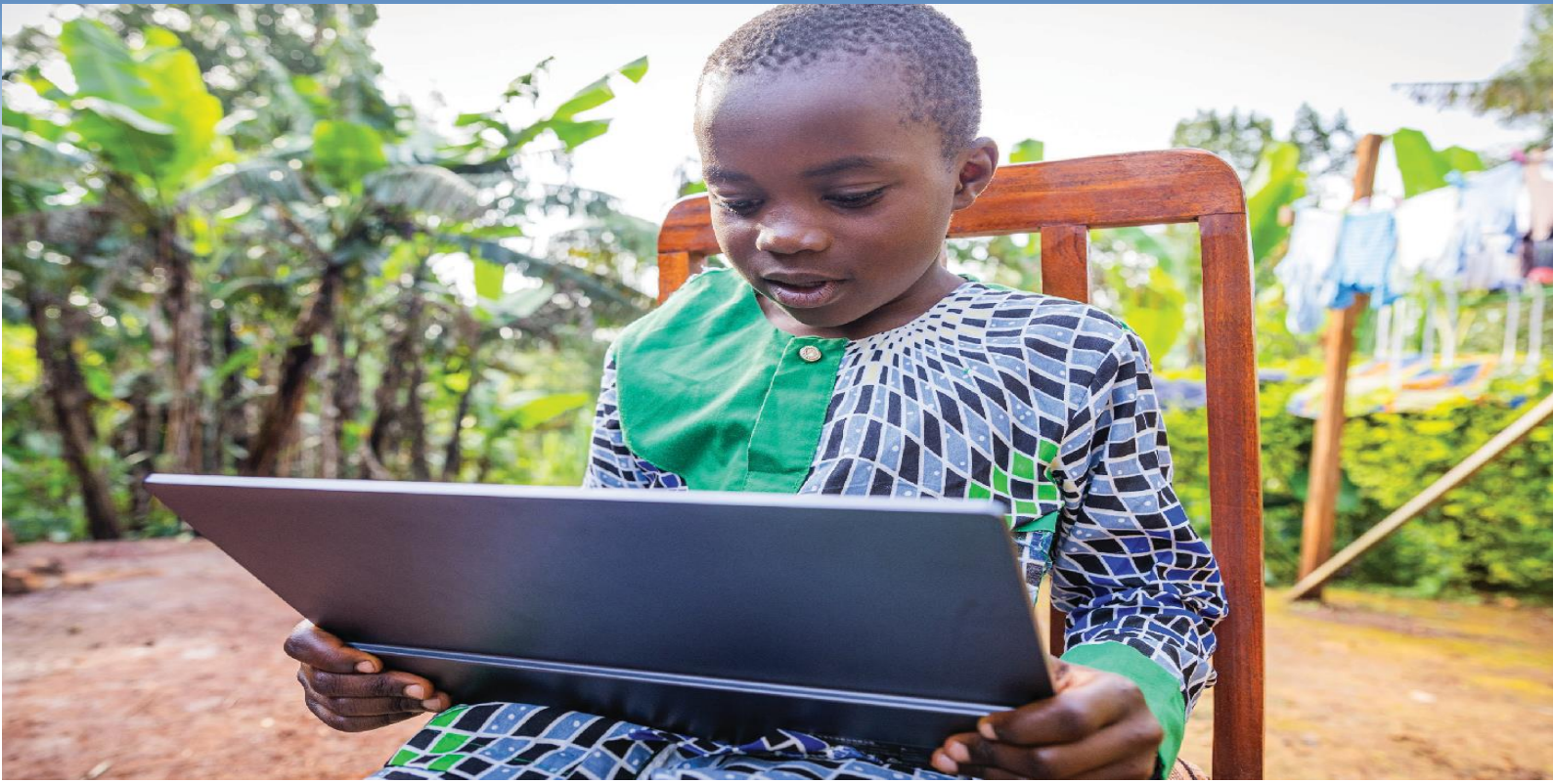
The Strategy bears the vision of *"improving learning outcomes through digital technologies" and the mission of "enhancing access to quality teaching, learning and administration in educational institutions through the use of digital technologies, thereby enabling every learner to be equipped with skills to contribute significantly towards national development".* The overall objective of the strategy is to use ICT to improve teaching and learning in all levels of education in Tanzania.

Moreover, the Strategy stipulates seven core pillars: (1) Infrastructure and Access; (2) ICT Integration in the Curriculum; (3) Digital Content Development; (4) Digital Assessment; (5) Human Resource and Capacity Building; (6) Innovation, Research, and Entrepreneurship; and (7) Emerging Technologies. To ensure the successful implementation of the digital education strategy across all levels, the core pillars are enabled by six supporting pillars: (1) Technical Support and Maintenance; (2) Partnership and Resource Mobilization; (3) Change Management; (4) Data Management and Analytics; (5) Security, Privacy, Safety and Ethics; and (6) Governance, Management and Regulatory Framework. The core and supporting pillars are aligned with strategic objectives and strategies. They are implemented using cross-cutting aspects through: (1) Monitoring, Evaluation and Learning; and (2) Sustainability plans to facilitate the annual targets.

Furthermore, for the Strategy to be enforced and operationalised, the following guidelines will be implemented: (a) National Guideline for Digital Education in Basic Education, (b) National Guideline for Digital Education in Technical and Vocational Education and Training (TVET), and (c) National Guideline for Digital Education in universities.

To make sure that the Strategy is implemented successfully across all levels of education, the MoEST will establish a centralised coordination section/unit/department to deal with digital education and training. The Strategy is designed as a rolling five-year plan with the expectation that it will be reviewed annually, if need arises, an and at the end of five-year period.





1.0 Introduction

1.1 Background

Competencies encompassing knowledge, skills and attitudes remain vital in today's global economy, characterised by globalisation and rapid technological advancements. Recognizing this reality, the Government of Tanzania prioritised education and leveraged Information and Communication Technology (ICT) to enhance global competitiveness and sustainable development. Through initiatives like the Tanzania Development Vision 2020-2025, the country aspired to cultivate a well-educated society and transition into an industrialised middle-income economy, thus elevating the quality of life for its citizens. Aligning with this vision, the National Five-Year Development Plan 2020-2025 underscores the imperative of enhancing education and training systems, including curriculum reforms to meet labour market demands and integrating research and development with economic activities.

In pursuit of inclusive and equitable education, both nationally and globally, frameworks like the Sustainable Development Goals (SDGs) and UNESCO Education Strategy provide guiding principles. SDG Goal No. 4 underscores the importance of quality education and lifelong learning opportunities for all, while UNESCO's strategic objective emphasises developing education systems that promote inclusivity and lifelong learning. Central to achieving these objectives is the significant expansion of infrastructure and access to ICT. Within this context, enhancing educational administration, teaching methodologies, and overall quality through digital education, ICT emerges as a thematic priority.

ICT assumes a pivotal role in fostering 21st-century skills and facilitating the

implementation of a Competency Based Curriculum (CBC). This integration is not only emphasised in educational policies but also reflected in education and training frameworks. The ETP of 2014 version 2023 and ICT Policy 2016 underscores the seamless integration of ICT in education and training as a means to enhance learning outcomes across all levels. Thus, harnessing ICT potential becomes imperative not only for individual skill development but also for the broader educational landscape's transformation, aligning Tanzania's educational aspirations with global trends.

ICT integration in Tanzania's education sector has evolved gradually, influenced by global digital trends and local socio-economic factors. The COVID-19 Pandemic has accelerated this evolution, particularly in higher education, where e-learning platforms and digital assessment systems have become prevalent. To support this transition, investments in digital infrastructure, teacher training, and content development have increased significantly. Overall, Tanzania's journey with ICT in education has shifted from basic infrastructure development to a more sophisticated approach focused on integration, content creation and pedagogical innovation.

In recent years, there has been a concerted effort towards inclusive ICT policies aimed at ensuring equal access, particularly in bridging the urban-rural gap and addressing gender disparities. Initiatives such as the Rural Energy Agency (REA) program have extended power to schools in rural areas, contributing to more equitable access. For instance, all primary and secondary school teachers have been provided with tablets to facilitate teaching and learning in primary and secondary schools and Teachers Colleges, as reported by the Basic Education Statistics and by the Ministry of Education, Science and Technology. This also applies to the Higher Education Economic Transformation (HEET) project executed in higher education institutions that, among others, enhancing ICT integration in teaching and learning by investing in more ICT infrastructure, systems, facilities and capacity building.

Also, in recent years we have witnessed public-private partnerships, involving international organisations, local telecom companies, and technology firms, playing a pivotal role in advancing ICT integration in education. These collaborations have mainly supported infrastructure development, digital content creation, and capacity building, contributing to the scaling of ICT initiatives. Building on these partnerships, the Government is focusing on strengthening regulatory frameworks and policies to further embed ICT in educational practices. Additionally, efforts are directed towards enhancing educators' training in digital pedagogies and promoting innovation in digital content creation at all levels of education of which its success requires a concerted and country-wide digital education strategy.

1.2 The Situational Analysis

The integration of ICT in education is pivotal, promising to transform teaching and learning at all levels of education. This situational analysis assesses the current landscape, focusing on trends, challenges, and opportunities. It offers a comprehensive overview of ICT use in education, including the effectiveness of existing initiatives, and factors influencing adoption. Through this analysis, MoEST makes a better understanding of the evolving dynamics of ICT integration, and then develops strategies to enhance ICT impact on educational outcomes across all levels of education.

1.2.1 Policy Context Analysis

1.2.1.1 *Tanzania Development Vision 2025*

The Tanzania Development Vision 2025, pinpoints five main attributes that will enable the country to achieve a middle-income country. One of the strategies to realise this long-term development agenda is to establish a well-educated and learning society. The Vision 2025 emphasises the promotion of science and technology education, to enhance productivity, through continuous learning and publicity campaigns. Furthermore, the Vision 2025 emphasises the promotion of ICT to build appropriate skills and capabilities; and adequate investment to improve the quality of science-based education and to create a knowledgeable society. In general, the Tanzania Development Vision 2025 explicitly notes the new opportunities that ICT is opening up and can be harnessed to meet the goals as well as all five attributes stipulated in the vision.

1.2.1.2 Education and Training Policy 2014 Version 2023

The Education and Training Policy (ETP) 2014 version 2023, among others, considers having strategies for strengthening the development of Science, Technology and Innovation (STI) and integration of ICT in teaching and learning. Moreover, ETP insists on the curricula for science and technology to motivate students to realise the importance of science and technology in the society. It also provides a link to science in schooling with careers that directly involve science and technology. Moreover, it provides improving sustainable technological development and other possible societal applications of science that require the support of scientifically and technologically

informed citizens. The policy further emphasises the need to develop simulation techniques using ICT and enhance the education system to develop capacities for online and distance learning education. It also emphasises introducing ICT as a basic subject in primary education and maintaining it throughout basic and tertiary education.

1.2.1.3 The National ICT Policy 2016

The objectives and statements of the National ICT Policy 2016 that drive this Strategy include: (a) promote and develop ICT human capital, digital skills and talents among Tanzanians to become active players in the digital transformation agenda; (b) strengthening the institutional, legal and regulatory environment for governance of the ICT sector covering strengthening of the legal framework for the governance of the ICT sector; and (c) enhancing frameworks for strategic governance and management of ICT at the national level.

Specifically, the National ICT Policy 2016, on “ICT Human Capital Development”, under the “Strategic ICT Leadership and Human Capital Development”, the policy statement (3.1.2.2), states that the Government shall ensure effective use of ICT in teaching and learning throughout the formal and informal education system. Moreover, on “Infrastructure Development”, under the “Broadband Access and Infrastructure Development”, the policy statement (3.2.2.2), states that the Government shall ensure safe and reliable ICT infrastructure development countrywide; and e-ready infrastructure developed countrywide which supports provision of ICT services. Both statements show the commitment of the Government towards providing for the infrastructure for the use of ICT in teaching and learning.

As stipulated in the National ICT Policy 2016, the Government is also committed to provide a reliable, affordable, secure, interoperable, and sustainable hard digital infrastructure countrywide for universal and meaningful connectivity covering creating an enabling environment for the public and private sector to sufficiently invest in hard digital infrastructure. It also stipulates that the Government is committed to strengthen integration in planning and implementation of hard digital infrastructure projects and promote sharing of infrastructures in delivering

digital services, continue expanding and strengthening the National ICT Broadband Backbone infrastructure and its services to deliver broadband services efficiently, ensure financing mechanisms for affordability and accessibility of computing devices and digital services to marginalized groups in rural and underserved urban areas, promote the development of people-centric and integrated soft digital infrastructure and services, and enhance private sector participation in developing ICT solutions.

In addition, the National ICT Policy 2016 states that the Government is committed to promote ICT research and development by ensuring sustainable funding mechanisms that facilitate ICT research and development initiatives, ensuring widespread access to cutting-edge technologies for ICT research and development, promoting collaboration among educational institutions, researchers, industries, and government agencies, and empowering researchers with necessary ICT research and development skills.

Moreover, the Policy indicates that the Government of Tanzania is committed to establish a responsive and adaptive environment for the development and utilization of new and emerging technologies including Artificial Intelligence (AI) and related technologies. Specifically, the Policy objectives include: (a) developing frameworks for the adoption and governance of new and emerging technologies, (b) investing in developing new and emerging technologies in ICT solutions and services, (c) building capacity for the development and use of new and emerging technologies including AI, and creating an enabling and holistic strategic framework for AI that encourages innovation, (d) development of home-grown ICT innovative products and services.

Finally, the Policy states that the Government is committed (a) to promote public-private partnership (PPP) investments in developing the ICT sector; (b) facilitate capacity in public institutions to engage in PPP investment projects in the ICT sector; and (c) prioritise and publicise critical ICT investment areas for investment using PPP.

1.2.1.4 Five-Year Development Plan III 2021/22 – 2025/26

The third Five Year Development Plan (FYDP III) 2020/21 – 2025/26 includes a strategic intervention to strengthen

the quality of education provision by increasing the use of ICT towards improving quality of life as aligned with Vision 2025. This requires the provision of infrastructure and tools to proceed at an appropriate pace in parallel to the delivery of capacity-building activities that will ensure that education stakeholders are well-equipped to effectively leverage the investments made in this area.

1.2.1.5 Education Sector Development Programme (2021/22 – 2025/26)

The Education Sector Development Programme (ESDP) aims at expanded and improved use of ICT in teaching and learning, including enhancing ICT infrastructure and development of e-learning platforms and digital skills. In this way, it contributes to the transformation of the education sector into an efficient, effective, outcome-based system and ensuring equitable access to education and training for all, in line with Sustainable Development Goal Number 4 (SDG-4).

1.2.1.6 Tanzania Digital Economy Strategic Framework (DESF) 2023

The Tanzania Digital Economy Strategic Framework underscores digital education as essential for effectively harnessing digital technologies and driving innovation in the digital economy, as stipulated in pillar 3: Digital Literacy and Skills Development. The pillar emphasizes promoting digital literacy, enabling individuals to access, comprehend, assess, and utilize digital information and technologies. The framework also emphasizes skills development, focusing on training individuals to attain proficiency and expertise in using specific digital tools or platforms to fulfil roles within the digital economy landscape. The soft digital infrastructure is integral to supporting the structure and functionality of digital education, particularly through digital platforms dedicated to e-education.

1.2.1.7 National Research and Innovation Monitoring Framework 2020

The National Research and Innovation Monitoring Framework 2020 emphasizes the pivotal role of research and innovation in generating relevant technologies and solutions that can expedite the country's economic and

social development processes. The Framework introduces a unified set of indicators aimed at monitoring the outcomes, outputs, and impact of investments in research and innovation, encompassing initiatives in digital education as well.

1.2.1.8 The Government Cyber Security Strategy 2022–2027

The Government Cyber Security Strategy 2022–2027 provides a cyber-risk landscape by reducing vulnerabilities, countering malicious actors in cyberspace, responding effectively to incidents, and enhancing the security and resilience of the Government's cyber ecosystem. In the education sector, the Strategy mandates that institutions, including schools, colleges and universities, cultivate a well-trained workforce equipped with comprehensive cyber security knowledge aligned with their respective roles and responsibilities. This trained workforce is crucial for incident management and organizational protection. Against this background, educational institutions should prioritize increasing awareness of cyber security threats, associated risks, and necessary protective measures throughout the organization.

1.2.1.9 The Tanzania e-Government Strategy 2022

The Tanzania e-Government Strategy 2022 emphasizes education services as integral components of e-government services, highlighting the importance of multiple channels for accessing high-quality e-education. Additionally, the Strategy leverages research, scientific inquiry, and knowledge advancement as fundamental drivers for discoveries, inventions, and innovations aimed at optimizing technology utilization and generating new local solutions. Thus, through research and innovation, the Strategy underscores the importance of promoting locally developed e-government innovations, adopting emerging and environmentally sustainable e-government technologies, and fostering collaboration with stakeholders in e-government research, innovation, and development.

1.2.1.10 Ruling Party Manifesto 2020-2025

The ruling party manifesto recognizes the benefit of the great development of technology in the world economy and educational reforms. It emphasises strengthening ICT

integration in teaching and learning in basic education by providing training to all teacher trainees in Government teacher colleges. It also emphasizes establishing centres (incubators) and special technology clusters as well as developing and supporting graduates of such centres to start companies. Additionally, it insists on strengthening the centre for research, innovation and ICT development, including building capacity and increasing the use of new digital technologies and artificial intelligence. Moreover, the manifesto emphasizes strengthening collaboration with private sectors to build expertise in digital technology, manufacturing and the use of robots in all fields of ICT and the field of “Artificial Intelligence”.

1.2.1.11 Sustainable Development Goals (SDGs) - 2030

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. SDG - 4 clearly states that, by 2030, there must be a substantial increase in the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship. This will be indicated by the proportion of youths and adults with information and communications technology (ICT) skills.

1.2.1.12 African Union Agenda 2063 - The Africa We Want

Africa’s Agenda 2063, Aspiration 1, Goal 2 emphasizes

developing well-educated citizens and skills revolutions underpinned by science, technology and innovation. The agenda also emphasises the need for Africa to revise and adapt its development vision in the face of changing global contexts such as the ICT revolution. This policy provides strategies to enhance the capacity of policymakers and education managers on the integration of ICT in education, training and management.

1.2.1.13 UNESCO Guidelines for ICT in Education Policies and Master Plans 2022

UNESCO recognizes that ICT is an important tool to provide new and more flexible ways of accessing quality teaching, learning contents, and other education resources and opportunities. Some of the areas where ICT can play a key role in education and training sector to facilitate and accelerate the achievements of SDG - 4 as mentioned in the UNESCO Qingdao Declaration 2015 include: (a) expanding access to quality education opportunities and advancing inclusion, (b) enhancing the relevance and quality of learning, (c) building ICT–enabled lifelong learning pathways, (d) strengthening education and learning management systems and monitoring learning processes, and support the acquisition of digital literacy knowledge, skills and competences, which are foundational to success in education and training contexts.

UNESCO provides also various ICT–based policies and guidelines in education such as the ICT in Education Policy Toolkit 2018, and ICT Competency Framework for Teachers (version 3) 2018 to guide the development of thematic policies and masterplans on building teachers' capacities in making pedagogical use of ICT. On Open Education Resources (OER) as a cross–cutting policy area, the UNESCO Recommendations on Open Education Resources (OER) – 2019 document outlines key action plans to promote the use of OER in education and training sectors. In addition, the UNESCO Guidelines on the Development of OER Policies 2019 provides guidance to policy -makers on the planning of OER policies. Moreover, the UNESCO AI and education: Guidance for policy-makers (UNESCO, 2019; UNESCO, 2020) provide a comprehensive recommendation for planning policies on AI and education.

1.2.2 ICT Integration in Education

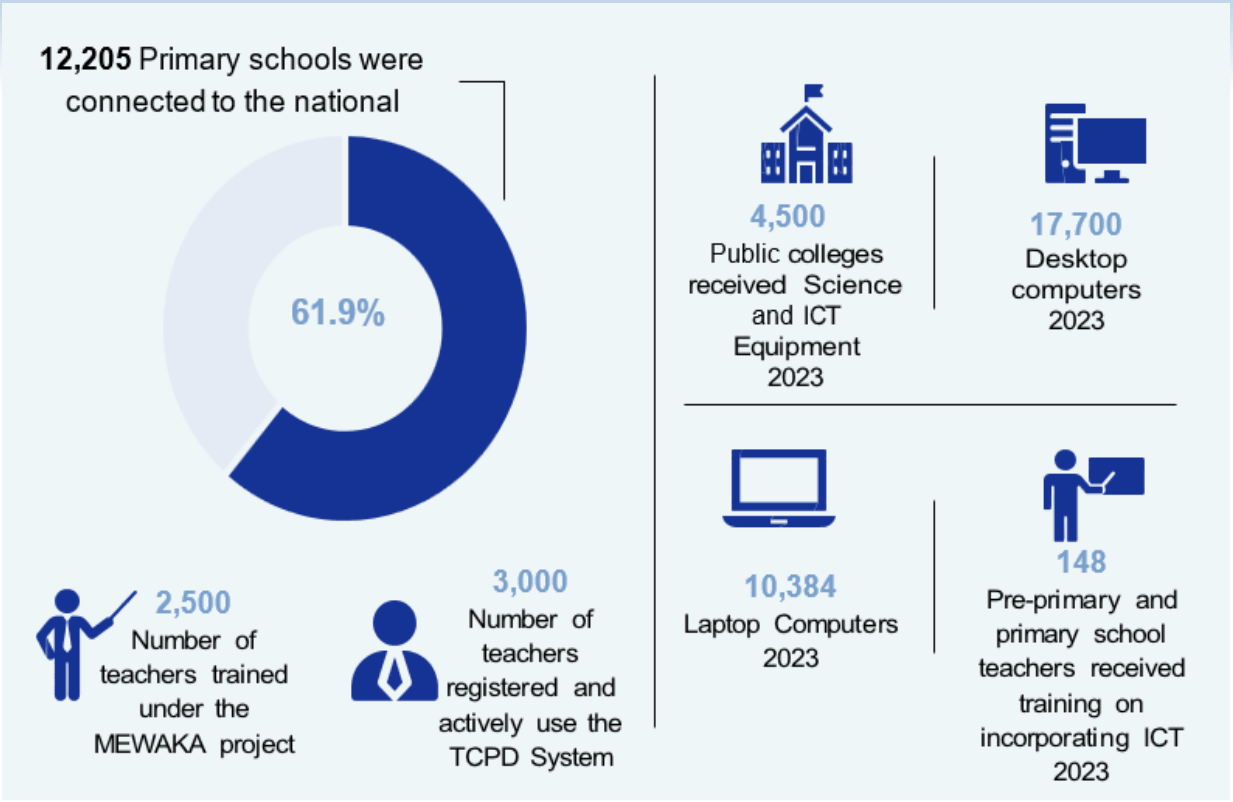
1.2.2.1 Basic Education

i Pre and Primary Education

The Tanzanian Government emphasizes integrating ICT into education to improve skills and learning outcomes for all students, fostering inclusivity for those with diverse challenges. Efforts made to date by the Government include building science laboratories with ICT facilities to enhance STEM teaching and learning in primary schools. In 2020, 1,696 public schools received science and ICT equipment. Moreover, the Government provides ICT training to primary education trainee teachers to enhance teaching methodologies.

In 2023, there were 17,700 desktop computers and 10,384 laptop computers in primary schools, of these, 12,205 (61.9%) primary schools were connected to the national grid. Additionally, in 2023, 148 pre-primary and primary school teachers received training on incorporating ICT into their teaching practices.

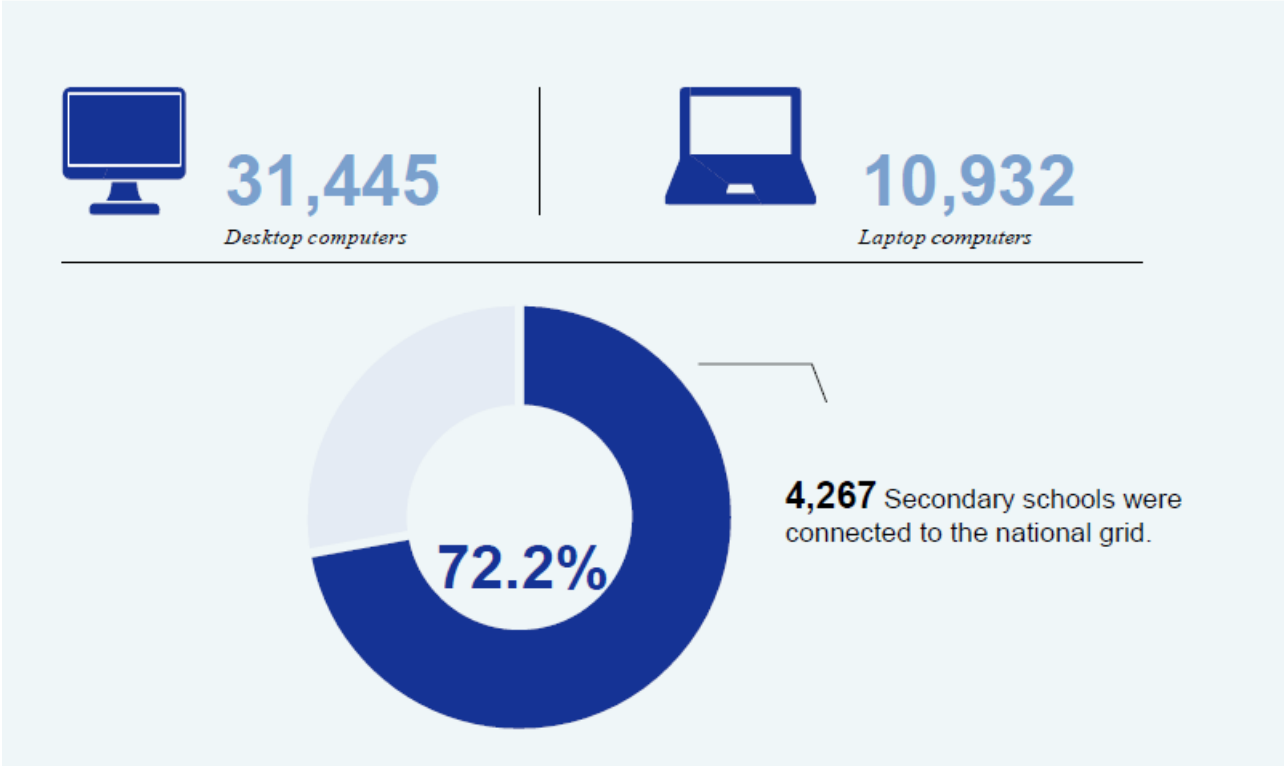
The impact of the Tech-Supported, School-Based Teacher Continuous Professional Development (TCPD) Model on Learning Outcomes in Tanzania and MEWAKA (Mafunzo Endelevu kwa Walimu Kazini) projects have been providing technology-supported, decentralized, and school-based TCPD to improve teaching and learning in rural primary schools in Tanzania. So far, 2,500 teachers have been trained under the MEWAKA project, enhancing their ability to utilize digital technology in education. Additionally, 3,000 teachers are registered and actively use the TCPD system.



The TCPD Model leverages the Learning Management System (LMS) to facilitate continuous professional development for teachers in remote areas with limited internet connectivity. The Model allows teachers to access training materials, participate in online discussions, and receive feedback from mentors, significantly enhancing their professional skills and teaching practices. The BOOST Primary Student Learning Project aims to improve equitable access to quality learning in pre-primary and primary education by providing capacity building in curriculum, learning assessment, and teacher management, as well as leveraging ICT to support teachers and classroom teaching. As part of this initiative, 200 pre-primary and primary teachers and 200 school administrators received training on using ICT in teaching and learning. The Tanzanian Government launched other initiatives to integrate digital technology into primary education, including the deployment of interactive digital content and e-learning platforms in classrooms, and the establishment of ICT resource centers to support ongoing teacher training and development in digital literacy. These efforts reflect a comprehensive strategy to enhance the use of digital technology in primary schools across the country.

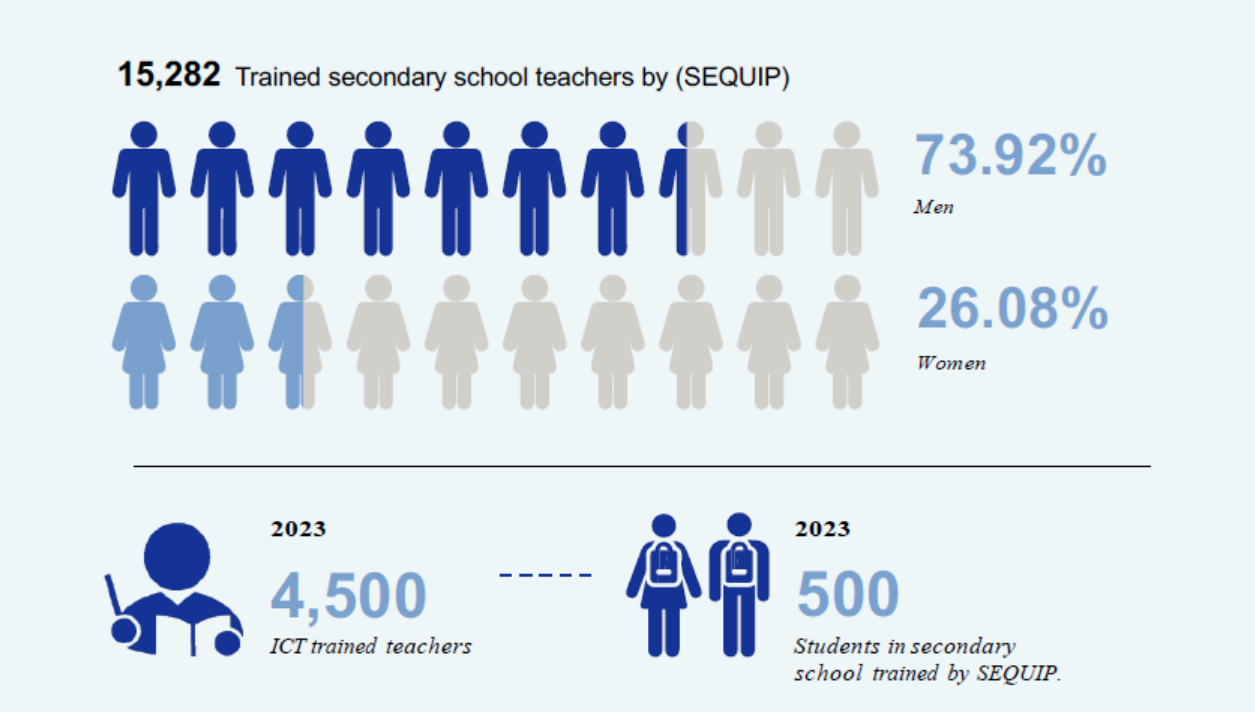
ii Secondary Education

At the secondary education level, both government and non-government secondary schools were equipped with 31,445 desktop computers and 10,932 laptop computers. However, only 4,276 (72.2%) of these secondary schools were connected to the national grid.



Various specialized training and capacity-building programs have been implemented across different levels of basic education. In 2021, Universal Communication Services Access Fund (UCSAF) delivered ICT training to 650 public secondary school teachers, focusing on integrating ICT into teaching and learning, as well as basic troubleshooting skills. Through the Tanzania Secondary Education Quality Improvement Project (SEQUIP) project, the Government has trained 15,282 secondary school teachers (26.08% women,73.92% men) out of a target of 20,000. SEQUIP emphasizes digitally-enabled effective teaching and learning; and the adoption of digitally-enabled teaching of STEM subjects. Furthermore, the Government provided ICT training to 4,500 teachers from 1,300 secondary schools in 2023, aiming to enhance their competencies in utilising ICT for teaching and learning purposes. The SEQUIP has facilitated training on using ICT in teaching and learning to 500 students in secondary

school. The Government creates e-content, particularly tutorial videos, for teaching practical aspects of science subjects such as Biology, Chemistry, and Physics. These e-contents incorporate multimedia elements like video,



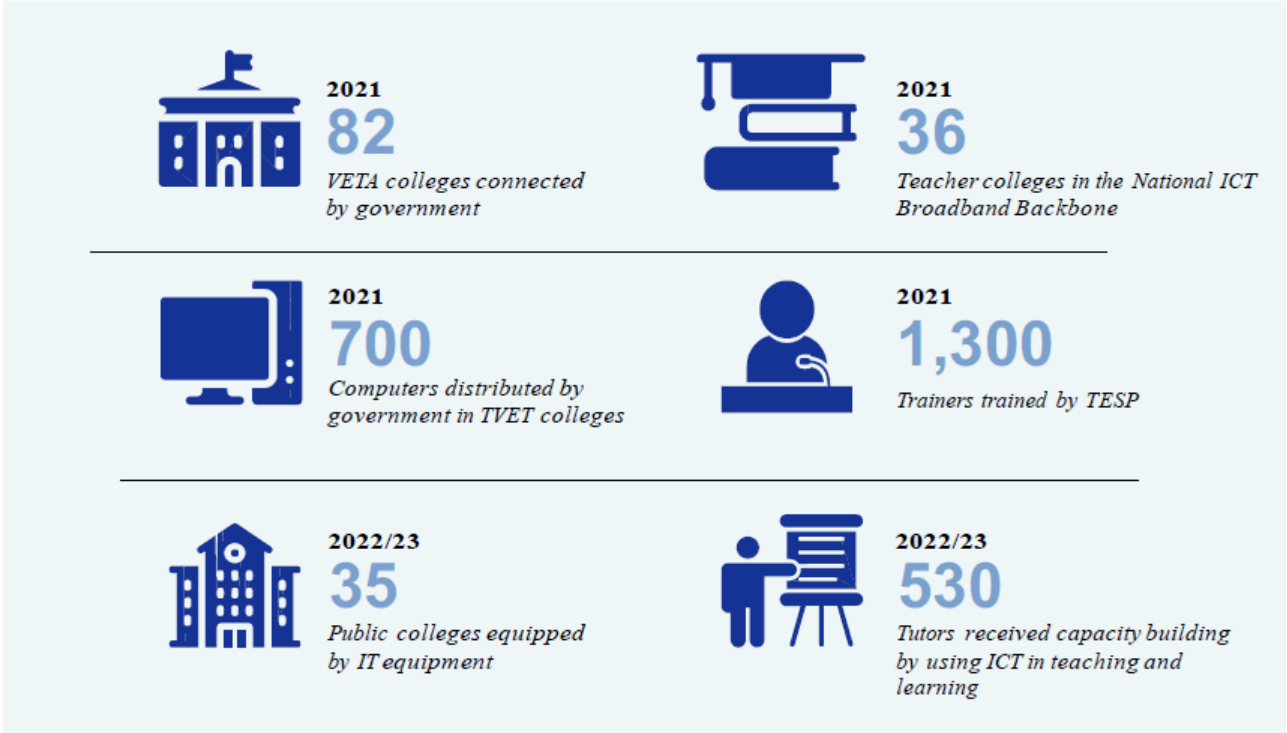
audio, or animation to facilitate comprehension of complex topics by learners. In 2023/24, the Government focused on developing digital content for primary education, specifically producing 58 lessons. These lessons aim to enhance the teaching and learning of fundamental skills like reading, writing, and arithmetic (3Rs).

The Government developed and uploaded digital textbooks for Forms 1 to 6 covering various subjects to an online library accessible for free. Additionally, 53 books and 17 digital contents received certification for use in basic education. In 2022/23, the Government enhanced the digital library of the Tanzania Institute of Education (TIE), expanding its capacity to host diverse digital content formats and adding new books. This library, accessible at https://ol.tie.go.tz, provides free access to books, facilitating easier accessibility for users.

1.2.2.2 Technical and Vocational Education and Training

The Government has been integrating ICT in Technical and Vocational Education and Training (TVET) Colleges to enhance teaching and learning. TVET colleges have been equipped with computer laboratories. Furthermore, in

2021, the Government connected 37 out of 82 VETA colleges and 36 Teacher Colleges in the National ICT Broadband Backbone (NICTBB) to facilitate teaching and learning through ICT. In 2022/23, the Government distributed 700 computers in TVET colleges to strengthen ICT integration in teaching and learning. In 2023/24, the Government developed an ICT in education strategy for basic education, Folk Development Colleges (FDC) and Teacher Colleges - ICT 2023. The Learning Management System (LMS) for in-services Teachers Continuous Professional Development (TCPD) has been developed with digital modules, manuals, and books to enhance teaching and learning online. The Teachers Education Support Project (TESP) programme was initiated by the Government to improve teachers' training and build digital infrastructure in teaching colleges. TESP has provided training to more than 1,300 trainers and equipped all 35 public colleges with IT equipment connecting them to the national internet backbone. Capacity building was also provided to 530 tutors from 17 Teacher Colleges on the use of ICT in teaching and learning.



The East African Skills for Transformation and Regional Integration Project (EASTRIP) and the Education and Skills for Productive Jobs (ESPJ) Project have been instrumental in enhancing ICT capacity within the TVET sector. EASTRIP has improved some TVET institutions by

upgrading digital infrastructure, providing advanced equipment, and developing ICT-based training programs to foster industry-relevant skills. These upgrades have enhanced digital learning environments, making them more responsive to both the local and regional labour markets. In addition, the ESPJ Project has supported professional development of TVET educators and administrators in various aspects including ICT. ESPJ has also focused on upgrading student information management systems, allowing better academic record management, operational efficiency, and streamlined administrative processes across various institutions. Together, these projects have strengthened the integration of ICT in TVET institutions, fostering flexible, student- centred learning environments and enhancing digital literacy skills among both educators and learners.

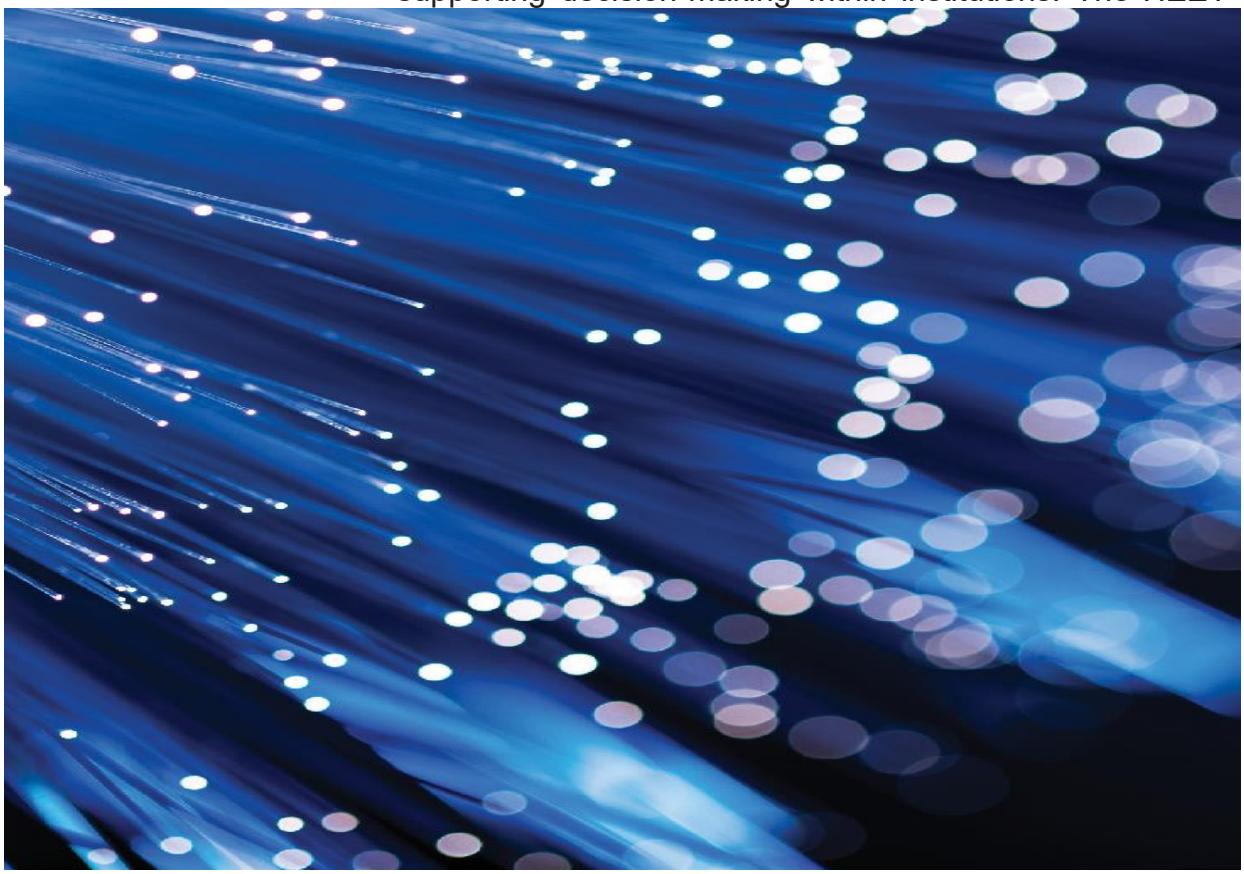
1.2.2.3 Universities

Universities in Tanzania have been undergoing significant transformations through various government initiatives aimed at enhancing digital education and administrative efficiency. Notably, the Higher Education for Economic Transformation (HEET) project is spearheading these efforts, focusing on modernizing academic programme delivery and administrative processes to improve learning outcomes and labour market alignment of priority programs. The HEET project has been pivotal in this transformation, significantly investing in state-of-the-art ICT infrastructure and upgrading learning resources and equipment across various universities.

The HEET project enabled the adoption and enhancement of Learning Management Systems (LMS) such as MOODLE. Most universities in Tanzania have adopted these open-source platforms to support blended learning, distance education, and flipped classrooms. Among the institutions surveyed, 13 have upgraded their LMS using HEET funds, while 4 are developing new LMS platforms. This focus on LMS is crucial for expanding access to education and improving learning outcomes.

The HEET project also emphasizes the modernization of administrative processes through digital technology. Fourteen institutions have implemented or are planning to implement Student Information Management Systems

(SIMS) to manage student data and academic records efficiently. This modernization is vital for streamlining administrative services, improving data management, and supporting decision-making within institutions. The HEET



project has made substantial progress in developing ICT infrastructure across universities in Tanzania. The Tanzania Education and Research Network (TERNET) emerges as the primary provider of internet connectivity for seven institutions under the HEET project, followed by the Tanzania Telecommunications Corporation Limited (TTCL) for five institutions, and Vodacom for three institutions. This distribution ensures diverse and reliable internet service provision essential for digital learning and administrative functions.

Bandwidth sizes across these institutions vary significantly. Four institutions have bandwidth sizes ranging from 101 to 500 Mbps, suitable for a variety of online activities. However, three institutions have bandwidth sizes of less than 50 Mbps, which may be inadequate for demanding applications such as high-definition video streaming or large-scale online assessments. Additionally, three institutions have bandwidth between 501 to 1000 Mbps, and two institutions have more than 1000 Mbps, indicating a substantial investment in high-speed internet to support

advanced digital learning environments. With the implementation of the HEET project, there is hope for increased bandwidth and improved connectivity across all institutions, ensuring that even those with currently inadequate bandwidth will be able to support robust digital learning and online activities.

WiFi coverage is another critical component of ICT infrastructure under the HEET project. WiFi connectivity is most commonly available in libraries of 18 institutions and administrative buildings of 17 institutions, ensuring efficient access to online resources for students and staff. Lecture halls and classrooms also have significant coverage, reported by 14 and 13 institutions, respectively. This extensive WiFi availability facilitates the integration of digital tools into teaching and learning, enhancing interactive lectures, access to online course materials, and the use of LMS platforms.

Additionally, the project supports the implementation of Massive Open Online Courses (MOOCs) platforms, with two institutions planning to integrate MOOC platforms to complement existing LMS implementations and offer multimedia-enhanced content. Furthermore, 18 out of 19 institutions receiving HEET funding are planning to upgrade their digital libraries, indicating a strong commitment to enhancing digital infrastructure. These upgrades will ensure that students and faculty have access to the latest educational resources, further supporting the digitization efforts.

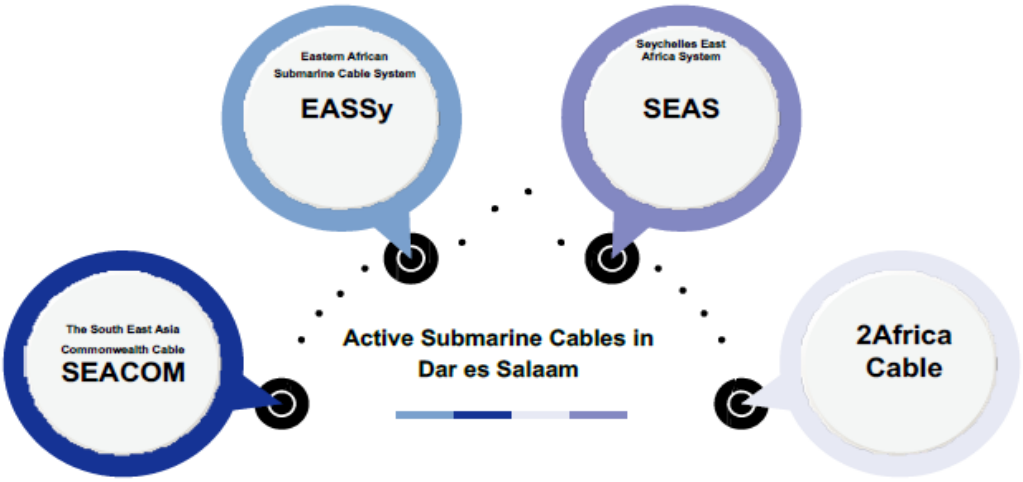
In 2022, the Tanzanian Government, through the Tanzania Commission for universities (TCU), issued the “Guidelines for Online and Blended Delivery Modes of Courses for University Institutions.” These guidelines aimed to successfully guide the development and use of digital content in higher education. This initiative led to substantial growth in ICT programmes, with 161 ICT courses offered by accredited institutions and ICT graduates making up 5% of total graduates, a fourfold increase compared to 2016.

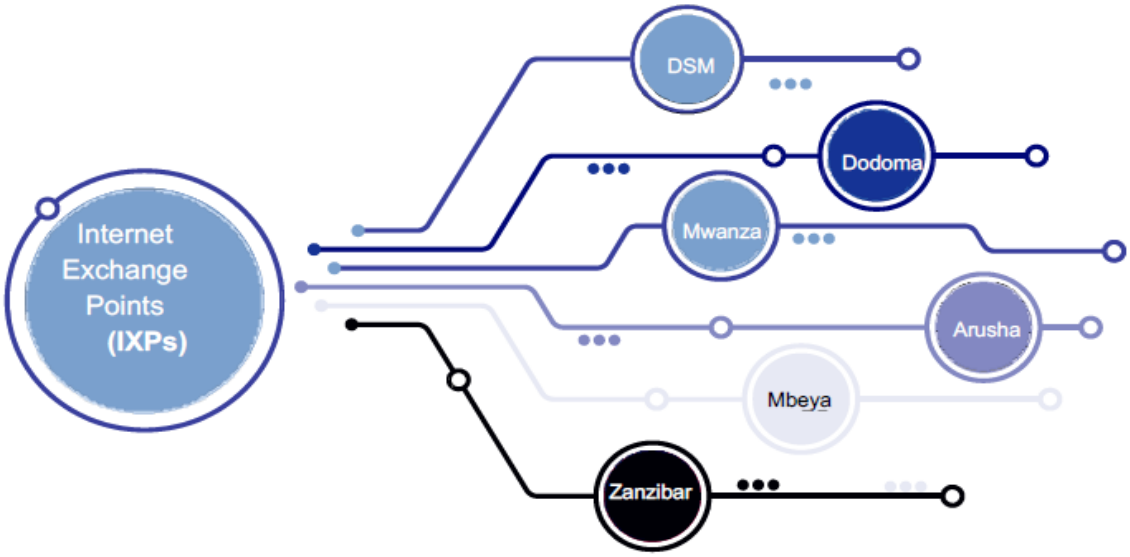
1.2.3 ICT Facilities and Infrastructure

1.2.3.1 National ICT Broadband Backbone

Tanzania has completed the National ICT Infrastructure

Backbone (NICTBB) as an important strategic vehicle to enhance the use of ICT in teaching and learning. By mid-2023, Tanzania was connected to four active submarine cables which land in Dar es Salaam: The South East Asia Commonwealth Cable (SEACOM), Eastern African Submarine Cable System (EASSy), Seychelles East Africa System (SEAS) and 2Africa Cable. By mid-2023, the country had six (6) Internet Exchange Points (IXPs) operated by Tanzania Internet Service Providers Association (TISPA) located in Dar-es-Salaam, Dodoma, Mwanza, Arusha, Mbeya and Zanzibar to ensure all local traffic remain locally routed.





Mwanza Arusha The National ICT Infrastructure Backbone provides reliable, efficient, and cost-effective accessibility and Internet connectivity to enhance teaching and learning across all education institutions. In 2022/23 the

Government renovated ICT laboratories and connected 15 Government Teacher Colleges to NICTBB. The Government has also strengthened the use of ICT in higher education institutions by implementing the following: Procured backup software, data storage in NICTBB, strengthened the capacity of the Internet from 50 Mbps to 60 Mbps, and improved the Internet backup link to reach 1Gbps at various universities.

1.2.3.2 National Internet Data Centre

The National Internet Data Centre (NIDC) is a state-of-art tier-3 data centre connected with an upgraded Multiprotocol Label Switching (MPLS) National backbone with the support of SEACOM and EASSY submarine cables to offer multiple redundancy schemes and ensure the availability and reliability of Internet services. The NIDC provides the ideal data storage and backup as well as computing and connectivity to the government and private sector. The presence of NDC is an opportunity for the education sector to store digital teaching and learning resources which can be accessed anytime anywhere. Plans are underway to connect all educational institutions to the NIDC.

1.3 SWOC Analysis

The integration of ICT in education and training is essential for preparing learners for the demands of the modern world. In Tanzania, the Strengths, Weakness, Opportunities and Challenges (SWOC) analysis indicates that there are several internal factors (strengths and weaknesses) that can be considered by the Government and other development partners in the effective integration of digital technologies in education and training. There are also external factors (opportunities and challenges) at various levels that can enable or hinder the successful implementation of ICT in education and training.

There are factors which hamper informed decision-making and policy formulation, hence impacting the overall effectiveness of educational interventions. Therefore, this Strategy is developed to overcome the aforementioned internal and external factors of integrating digital technologies in education and training in Tanzania. In summary, Table 1 provides internal factors and Table 2 external factors in ICT integration in education and training contexts. These factors are also in line with documents reviewed in section 1.2.1 above.

Table 1: Strengths and Weakness of ICT Integration in Education and Training

Core Focus Area	Strength	Weakness
Infrastructure and Access	• Commitment of the Government to facilitate the development of ICT infrastructure in education and training • Expansion of the National ICT Broadband Backbone (NICTBB) • Establishment of a National Internet Data Centre (NIDC) • Existence of computing infrastructure in some schools and TVETS • Existence of computing infrastructure in all universities • Existence of e-GA standards and guidelines on ICT infrastructure and systems	• Inadequate implementation of ICT infrastructure at all levels
ICT Integration in the Curriculum	• Availability of institutions for developing and implementing the curricula	• Low adoption of ICT integration in the curricula
Human Resource and Capacity Building	• Existence of local education and training institutions at all levels to produce human resources with the required digital literacy skills and knowledge • Strong partnerships with development agencies/partners to implement digital literacy and skills development projects/initiatives • Existence of National ICT Policy 2016 that emphasizes the digital literacy and skills development	• Limited digital literacy and skills development programmes
Platforms and Digital Content Development	• Existence of institutions producing experts for digital content development • Existence of Tanzania Institute of Education (TIE) that develops digital contents for basic education	• Low adoption of the use of digital contents for teaching and learning

Core Focus Area	Strength	Weakness
Data Management and Analytics	• Availability of digital information systems for teaching and learning at all levels	• Inadequate quality of data in the digital education management systems • Limited data use capacity among educators and learners
Emerging Technologies	• Existence of Tanzania digital economy strategic framework 2024-2034 • Existence of donor-funded projects that support the adoption of emerging technologies • Commitment of the Government to the application of emerging technologies for socio-economic development	• Low adoption of emerging technologies in education and training
Research, Innovation and Effective PPP	• Strong support from the Government and donors in research and innovation • Existence of institutions to conduct research and innovations in the country • Existence of national governance and policy frameworks to support research, innovation and development • Existence of Tanzania Development Vision 2025 that recognises the importance of research and innovation in ICT.	• Poor ICT infrastructure to support research and innovation
Equity and Inclusivity	• Existence of the National Guideline for Gender Mainstreaming 2014; Persons with Disabilities Act 2010 • Existence of UCSAF, and TCRA transformations on ICT access	• Low level of awareness on inclusivity in education • Limited resources to integrate ICT in education • Low implementation of digital inclusiveness in education

Table 2: Key challenges/issues and opportunities of implementing digital education

Core Focus Area	Challenges/Issues	Opportunities
Infrastructure and Access	• Inadequate bandwidth and network coverage for schools in rural areas • High cost of connectivity and digital devices • Inadequate number of schools connected to the NICTBB • Poor digital infrastructure leads to limited access to technology, especially in rural or underserved areas • Inadequate access to energy sources especially for schools in rural areas • Disintegrated education management information systems and infrastructure in institutions • Inadequate Internet connectivity, and computer laboratories in schools	• Telecom service coverage countrywide • Mobile penetration in the country • Rural electrification programme • Increasing access to devices • The current expansion of the NICTBB
ICT Integration in the Curriculum	• Inadequate ICT competency-based curriculum in schools	• Development of ICT integrated curriculum
Human Resource and Capacity Building	• Inadequate adoption of teachers' digital competency frameworks • Inadequate resources to provide digital literacy and skills for educator • Inadequate training for educators to advance and upgrade their digital knowledge and skills • Inadequate ICT competency framework for delivering digital literacy and skills at schools, TVETs, and college • Inadequate opportunities for coding at schools • Inadequate number of educators with hands-on experience to teach digital literacy and skills and mentor students	• Digital literacy and skills development programmes • Inclusion of ICT courses in the revised primary school curricula • The current mobile device penetration in households

Core Focus Area	Challenges/Issues	Opportunities
Platforms and Digital Content Development	• Inadequate application of emerging technologies (AI, video gaming, VR, AR etc.) to create, share and manage digital content • Inadequate of multimedia resource centers to develop digital content by institutions • Inadequate alignment of digital content to existing curricula • Inadequate availability of digital open educational resources for learners • Inadequate pedagogical skills in developing digital content	• The current experience in digital content development by TIE • Establishment of multimedia labs at the university level through the HEET project
Data Management and Analytics	• Inadequate standards and guidelines in data management practices • Inadequate data governance framework for the education sector • Unavailability of standards and policies to collect, store, share, and use data to support decision-making	• The educational sector digital transformation programmes at various levels
Emerging Technologies	• Low adoption of emerging technologies in digital education • Inadequate adaptive environment for the development and utilization of new and emerging technologies	• Emphasis on adopting and developing emerging technologies

Core Focus Area	Challenges/Issues	Opportunities
Research, Innovation and Effective PPP	• Inadequate centres of excellence for digital technology integration in education • Inadequate of a national centre for research and innovation • Inadequate local innovation in the digitalization of education • Limited research in technology-based education regarding aspects of quality and inclusion • Inadequate coordination and experience sharing among partners in digital education • Inadequate platforms for the exchange of research and innovation efforts in digital education	• The ongoing digital education initiatives in the country • Availability of R & I support from educational stakeholders
Gender Inclusiveness	• Inadequate development of equitable and inclusive digital pedagogies • Inadequate technologies and platforms for promoting inclusiveness in education	• Promising efforts of inclusive digital literacy and skills at all levels

1.4 The Rationale and Justification

The Government, in collaboration with other key stakeholders, strive to foster and sustain an educational environment that promotes innovation and improved teaching and learning environment with the use of ICT throughout the country at all levels. Several challenges have affected the expansion of the deployment and use of ICT in education.

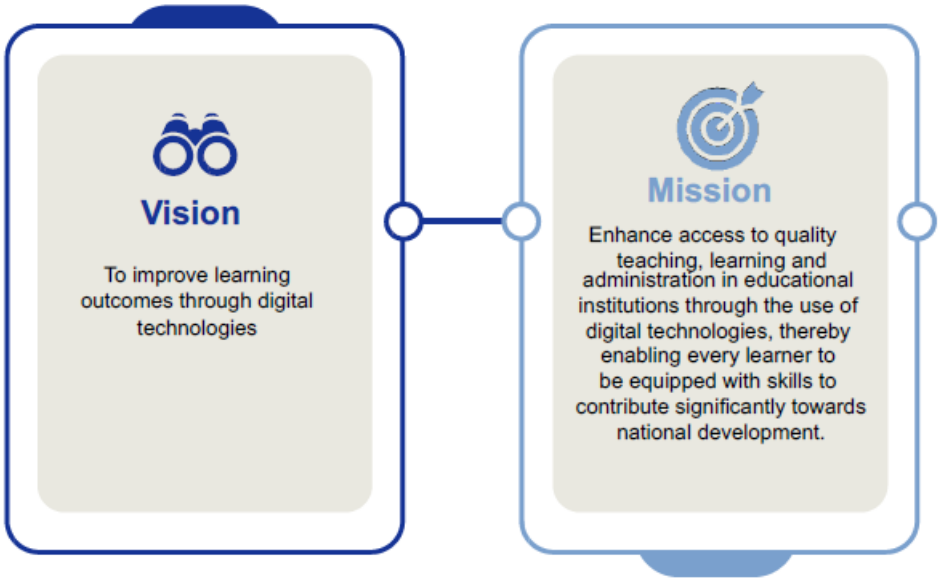
Tanzania has embarked on a new ICT Policy 2016 and revised Education and Training Policy 2014, Version 2023. The two policy documents have come up with new directions towards integrating ICT in the education and training sector. These policy documents necessitate the need for a new strategy for enhancing the effective implementation of ICT and the overall digital transformation of education across all levels.

Several ICT in education projects and initiatives have been implemented in different educational settings. The various initiatives by MoEST on ICT in education and training have largely remained uncoordinated, and segmented, and often, result in duplicated efforts by implementing agencies. Additionally, the projects and initiatives do not cover the whole country, hence widening regional disparities and adversely affecting equity. On the other hand, improper harmonisation of the projects and initiatives caused by a lack of clear guidelines has led to the random adoption of different systems and standards, unnecessary duplication of effort, and waste of scarce national resources.

In 2023, the Government developed an ICT in Education Strategy for Tanzanian Schools, Folk Development and Teacher Colleges to tackle this challenge. However, the Strategy 2023 did not cover other tertiary colleges and universities as well as the recently developed National ICT Policy 2016.

The National Digital Education Strategy, therefore, plays a key role in setting the national digital education priorities, harmonising, and increasing the coherence of digital education initiatives in the Tanzanian education system. It will ensure a coordinated approach in streamlining ICT integration in the education sector and ultimately improve learning outcomes for global competitiveness.

1.5 Vision and Mission



1.6 Objectives, Guiding Principles and Scope

The main aim of this Strategy is to guide the process of harnessing, deployment, and exploitation of digital technology within the education sector to improve learning outcomes.

1.6.1 Objectives

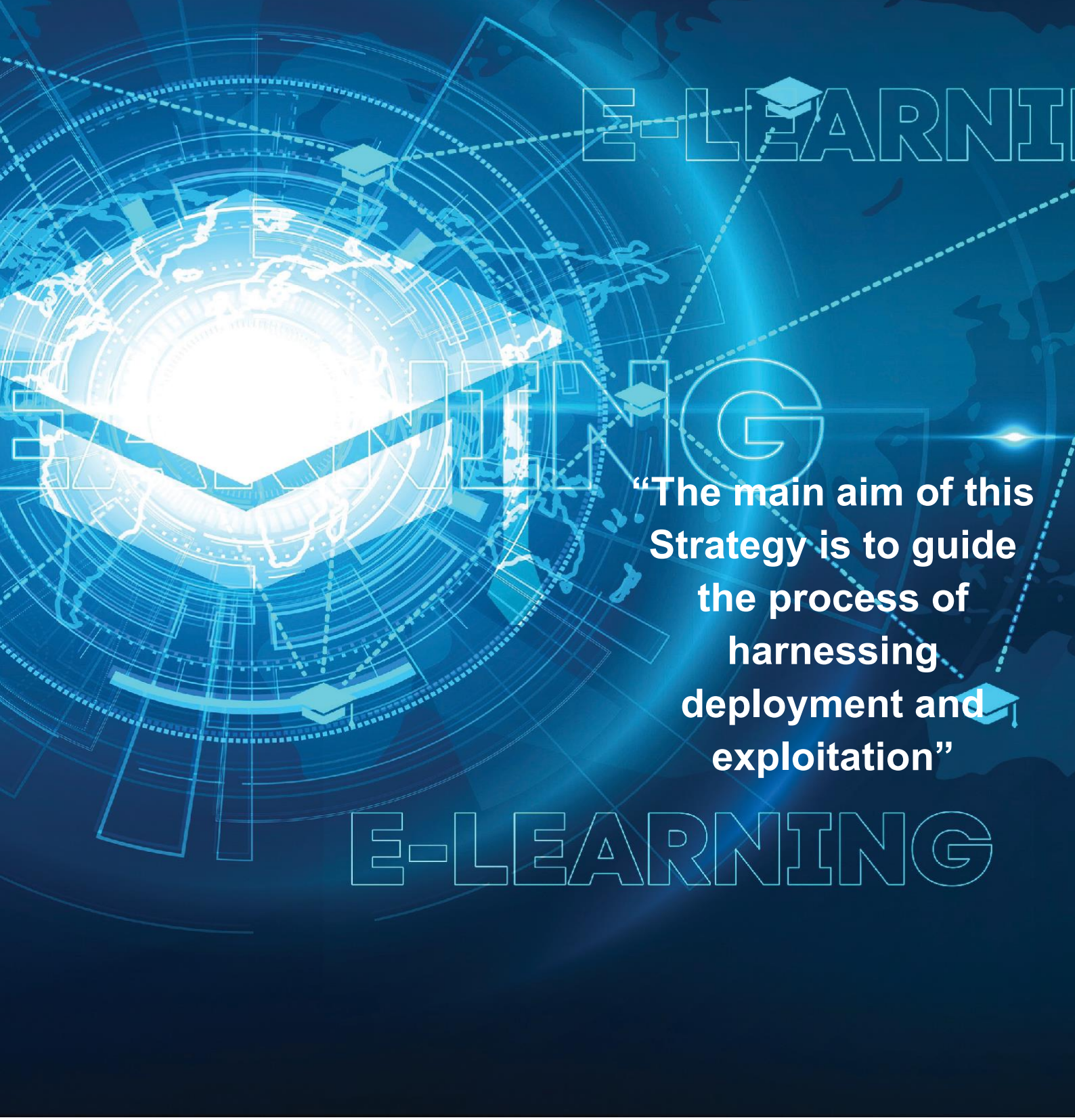
Specifically, the strategy targets to achieve the following objectives:

a. To ensure affordable and secured infrastructure to facilitate digital technology integration in education and training.
b. To promote an inclusive ICT integrated curriculum design and implementation.
c. To promote development and usage of digital contents to improve learning outcomes
d. To enhance learning outcomes by leveraging technology for effective assessment and feedback.
e. To enhance the capacity of personnel to facilitate the integration of ICT in education and training at all levels.
f. To promote and institutionalize research, innovation and entrepreneurship in the use of ICT in teaching and learning.
g. Promote investment, development and use of emerging technologies to enhance teaching and learning.
h. To ensure effective change management to support digital education transformation across all level.
i. To promote collaboration, partnership and resource mobilization to facilitate ICT integration in education and training.
j. To enhance centralized coordination of ICT integration in education and training at the Ministries and institutional levels.
k. To use educational data to improve learning outcomes across all levels of education.
l. Ensure ICT curricula are integrated with security, safety, and ethics modules and the secure, safe and ethical use of ICT in education and training.
m. To ensure availability of ICT technical Support to educators and learners for sustainable ICT Teaching and learning.

1.6.2 Guiding Principles

1.6.3 Scope of Application

The Strategy applies to all levels of education: schools, Folk Development Colleges (FDC), Teacher Colleges (TCs), Technical and Vocational Education and Training Colleges (TVET), and universities. It involves local and international partnerships as well as private and public collaboration in digital education and training.



“The main aim of this Strategy is to guide the process of harnessing deployment and exploitation”

2.0 The Strategic Framework

The National Digital Education Strategy is structured around seven core pillars and six supporting pillars derived from situational analysis in Chapter One. Core pillars entail focus areas that ensure technology transforms education effectively and equitably while supporting pillars refer to other areas that ensure digital education is implemented successfully across all levels. Figure 1 depicts the core and supporting pillars. The details of each pillar and its relevant strategies are provided thereafter.

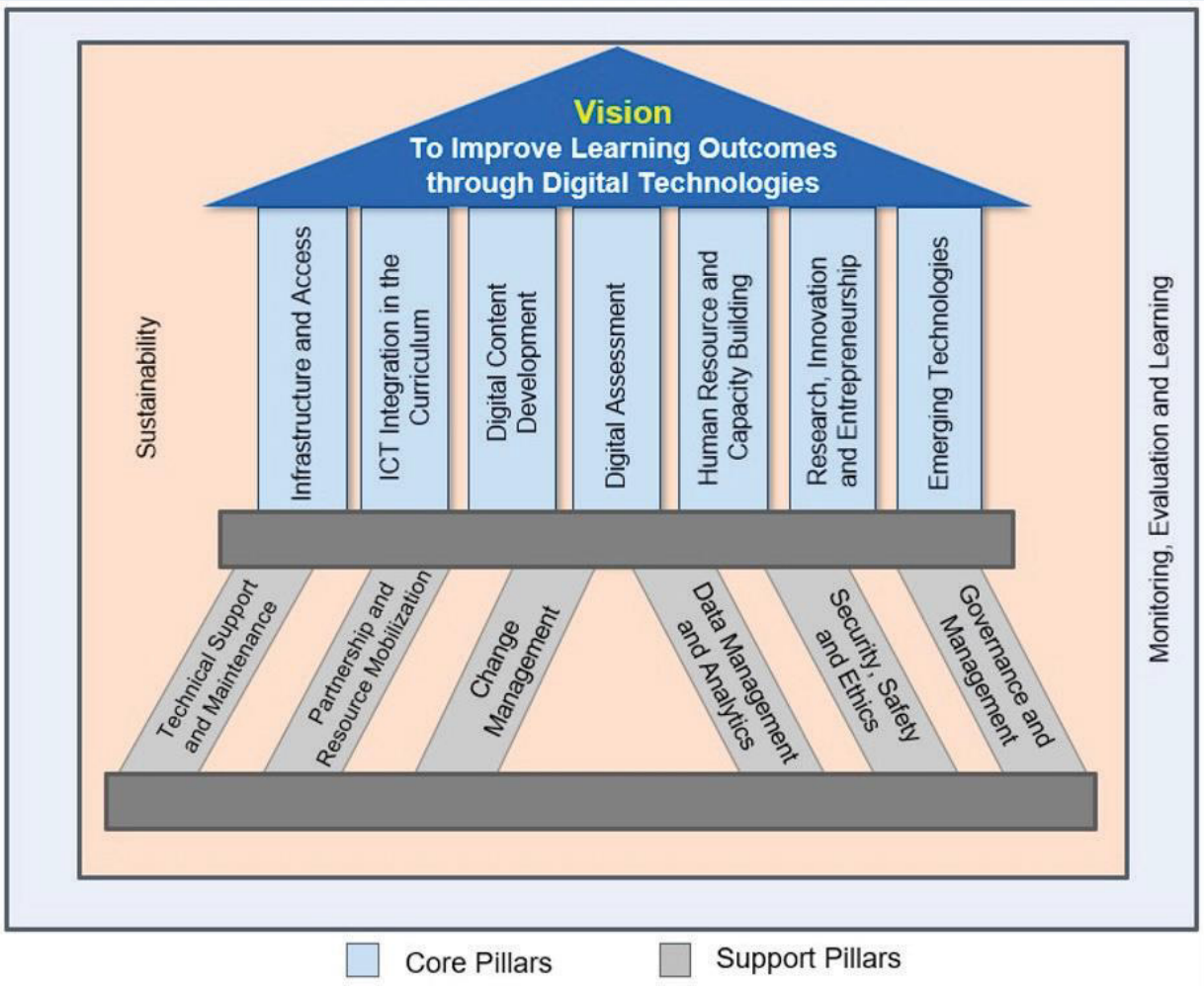


Figure 1: Core and Supporting Pillars

2.1 Core Pillars and the Strategies

2.1.1 ICT Infrastructure and Access

Infrastructure is an integral component of digital technologies for enhancing education and training. Access to ICT infrastructure, which encompass information and communication technologies, plays a crucial role in preparing educators and learners with essential skills for the digital age. Despite Government efforts such as provision of national fibre optic to all regions and supply of tablets to teachers, the number of computing devices is still inadequate and the cost of internet connectivity for education remains prohibitive. The Government, in collaboration with relevant stakeholders, will adopt the following strategies:

i. Facilitate provision of affordable, reliable and adequate Internet connectivity to all educational and training institutions;
ii. Facilitate accessibility and inclusivity of digital devices and services for teaching and learning to all education and training institutions;
iii. Ensure the availability and usage of secured platforms, media and systems;
iv. Facilitate the development and usage of educational digital content storage platform;
v. Facilitate the provision of affordable digital facilities (e.g., computer labs, digital libraries) to educational institutions;
vi. Ensure access to reliable sources of power supply to education institutions to enhance usage of ICT;
vii. Ensure availability of adequate, updated, upgraded and standard ICT resources in teaching and learning;
viii. Enhance access to quality diverse teaching and learning materials across all levels of education and training; and
ix. Promote offline and online access to digital resources.

2.1.2 ICT Integration in the Curriculum

A curriculum that clearly states the importance of ICT in improving teaching and learning outcomes should guarantee that educators and learners develop the necessary digital competencies. This kind of curriculum incorporates ICT-integrated standard guidelines and pedagogies, and it guides evaluation in a way that ensures the curriculum's learning objectives are met. Educators should incorporate ICT into their teaching and learning practices across all levels. The Government, in collaboration with stakeholders, will implement the following strategies:

i. Promote the integration of ICT into the curriculum across all levels;
ii. Promote effective use and development of digital educational technologies in the classrooms and administration across all levels;
iii. Promote an inclusive environment that enhances the use of ICT in teaching and learning at all levels of education and training;
iv. Promote integration of appropriate instructional design models (e.g., technological pedagogical content knowledge (TPACK) and Substitution, Augmentation, Modification and Redefinition (SAMR) into curriculum and instructional practices;
v. Enhance learners and educators' engagement by incorporating interactive and collaborative digital education technologies;
vi. Enhance learners' capacity to use and maintain relevant digital educational technologies; and
vii. Establish quality assurance standards on ICT-integrated

curriculum development, implementation and assessment.

2.1.3 Digital Content Development

The goal of this pillar is to enhance innovative teaching and learning process in all areas of the curriculum using digital technologies. The use of innovative technology- based pedagogical methodologies and ICT as well as digital content in the classroom can improve learning outcomes. Digital content, blended curricula and other e-learning resources are critical components in teaching and learning. The Government has put in place strategies for the development and management of relevant digital content and blended curricula for improving learning outcomes. The Government, in collaboration with other stakeholders, will use the following strategies:

i. Promote the development of relevant, interactive, inclusive, compatible and local digital contents across all levels of education;
ii. Promote the development and use of Open Educational Resources (OER) with a focus on digital content;
iii. Promote the development and use of e-libraries, digital content repositories, and Learning Management Systems (LMS);
iv. Promote the development and use of MOOCs to enhance lifelong learning;
v. Promote the use of relevant, inclusive and regularly updated digital content in teaching and learning across all levels;
vi. Ensure relevance and standards of digital contents in teaching and learning; and
vii. Ensure the educational related publications of all kinds are shared with public in relevant channels.

2.1.4 Digital Assessment

The digital assessment not only simplifies the evaluation process but also empowers learners to engage in self-assessment through online or web-based assessments. ICT enables educators to assess learner's learning effectively and efficiently. Using digital assessment, educators can provide rapid feedback,

customise learning circumstances, and enhance learners' engagement. In ensuring, ICT is used in assessment, the Government, in collaboration with stakeholders, will implement the following strategies:

i. Promote the development of relevant and inclusive digital assessment tools;
ii. Promote the use of digital tools for assessment across all levels; and
iii. Develop quality assurance tools for ensuring reliability and fairness in digital assessment.

2.1.5 Human Resource and Capacity Building

Successful integration of ICT into the learning environment depends on the ability of technical personnel, educators and learners to develop, customise, and use technology appropriately and encourage cooperative interaction and collaborative learning. Therefore, it is important to create an inclusive environment where learners, educators, and technical and administrative personnel are originally well-trained (pre-service) and continuously re-tooled (in-service) with the required digital skills and competencies (knowledge, skills, and altitude) to exploit the functional potential of ICT in education and training. The Government, in collaboration with stakeholders, will implement the following strategies:

i. Ensure availability of adequate technical ICT personnel to facilitate the integration of ICT in education and training;
ii. Develop ICT Competency Standards for educators to support integration of ICT in education and training;
iii. Ensure education institutions prepare adequate and competent personnel with good digital literacy and skills to integrate ICT in education and training at all levels;
iv. Strengthen Resource Centers to support educators and learners on ICT integration in education and training at all levels;
v. Develop and implement inclusive training programs for continuous capacity building of educators, administrators, technical staff and quality assurers on ICT integration in education and training at all levels;
vi. Ensure retention of competent staff in ICT integration in education and training;
vii. Promote exchange programs among national and international institutions on the integration of ICT in education and training at all levels; and
viii. Ensure recognition of ICT in education related programmes into the public service scheme.

2.1.6 Research, Innovation and Entrepreneurship

Technology is changing dramatically, and educators and learners need to continually research how emerging technological innovations can be of use in ICT in education and training. Research and innovation in ICT are critical components in the development of inclusive education. The Government needs to create an environment that facilitates innovative and effective ICT solutions that meet the needs of all educators and learners. A conducive and inclusive learning environment provides learners and educators with opportunities for research and innovation in digital education. The Government, in collaboration with education stakeholders, will adopt and implement the following strategies:

i. Promote inclusive research, innovation and entrepreneurship in the use and development of ICT in teaching and learning across all levels of education;
ii. Institutionalize research, innovation and entrepreneurship in the use and development of ICT in education and training;
iii. Build a centralised research-driven and inclusive innovation ecosystem that brings together a multi-disciplinary research and innovation network across the local and international institutions;
iv. Establish a national research and innovation centres to promote creativity and innovative minds in the use of ICT in education and training; and
v. Promote national self-sustenance in the development and use of educational technologies.

2.1.7 Emerging Technologies

New and emerging technologies such as artificial intelligence (AI), blockchain, virtual/ mixed/augmented reality, drones, robotics, Internet of Things (IoT), Big data, quantum computing, cybersecurity, autonomous vehicles, 6G, Cognitive Ratio (CR), and 3D printing are revolutionizing every sector. Each of these technologies represents a significant breakthrough, particularly AI that has taken the world by storm. These emerging technologies are typically employed to create new products and services in different application domains such as finance, healthcare, agriculture, production automation, and entertainment in a transformative way. Emerging technologies represent a diverse range of tools and innovations applied within educational contexts to enhance teaching and learning experiences. These technologies offer accessibility and the potential for fostering meaningful engagement, collaboration, and active participation among learners. The Government, in collaboration with other education stakeholders, shall:

i. Encourage integration of emerging technologies into curriculum and instructional practices;
ii. Sensitize education institutions, parents and communities on the proper use of emerging technologies in education and training;
iii. Promote the development and use of emerging technologies to enhance teaching and learning at the institutional level;
iv. Capacitate educators and technical personnel in developing and utilising emerging technologies;
v. Promote investment on inclusive enabling environment for the adoption of emerging technologies in teaching and learning at all levels of education;
vi. Promote public-private partnerships for the development and provision of emerging technologies across all levels of education and training;
vii. Promote establishment of digital innovation centres at national and community levels; and
viii. Promote research on development and utilization of emerging technologies in education.

2.2 Supporting Pillars and the Strategies

2.2.1 Change Management

Change management is essential for successful implementing digital transformations within the education system at all levels to ensure that educators, learners, and institutions can adapt to new technologies and methodologies. Change management guides smooth transformation and fosters a culture of continuous improvement and innovation. The Government, in collaboration with education stakeholders, will adopt and implement the following strategies:

i. Develop an inclusive change management mechanism to achieve the transformation of ICT integration in education and training;
ii. Promote effective communication within and across educational institutions and key stakeholders to facilitate smooth integration of ICT in teaching and learning;
iii. Create awareness on the availability and use of digital resources to facilitate teaching and learning across all levels of education and training;
iv. Use existing education fora to promote ICT integration in education and training; and
v. Review existing secular and guidelines to enhance a secured use of ICT in education and training.

2.2.2 Partnership and Resource Mobilisation

The Government, in collaboration with education stakeholders, have been providing physical and financial resources to facilitate the quality of teaching and learning in different levels of education to improve the quality of learning outcomes. However, this effort was not coordinated to cater for the need for equity and inclusive resource allocation at all levels of education. The key to the successful implementation of this Strategy is to ensure partnership and resource allocations of necessary budgets for the various investments and activities outlined in this Strategy. The Government, in collaboration with education stakeholders, will adopt and implement the following strategies:

i. Strengthen collaboration and partnership with other education stakeholders to make sure that resources are available and distributed accordingly;
ii. Promote harmonisation and the use of digital platforms to facilitate collaborations and partnerships for ICT integration in education and training;
iii. Promote local, national and international resource mobilization to support an inclusive ICT integration in teaching and learning at all levels of education;
iv. Promote partnerships with local and international organizations to produce cost- effective digital education products and services;
v. Promote partnerships with local and international organizations on e- waste management for sustainable digital resource usage; and
vi. Facilitate internships and apprenticeships of ICT integration in education to provide real-world practices.

2.2.3 Governance, Management and Regulatory Framework

The rationale for governance and management in the integration of ICT in teaching and learning is centred on structured planning, streamlined governance and management frameworks, and alignment with institutional strategies. This ensures effective direction and oversight of technology use, promoting accountability, ethical practices, and optimal integration of ICT tools to enhance the teaching and learning experience. Involving stakeholders and ensuring harmonisation further supports these objectives. The Government, in collaboration with education stakeholders, will adopt and implement the following strategies:

i. Establish a centralised coordination of ICT integration in education and training at the institutional levels;
ii. Strengthen Quality Assurance Units/Functions in line with ICT

integration in education and training across all levels.

2.2.4 Data Management and Analytics

Data management and analytics play a crucial role in digital education, offering valuable insights into student learning outcomes, teaching effectiveness, and overall educational performance. On the one hand, data management enables educators and institutions to make informed decisions based on accurate insights into learners' performance and resource utilization. On the other hand, data analytics enable the implementation of personalized learning pathways based on learners' unique learning styles, preferences, and abilities. Also, it can inform resource allocation decisions by identifying areas where additional resources, such as instructional materials, technology infrastructure, or personnel, are needed. The Government, in collaboration with education stakeholders, will adopt and implement the following strategies:

i. Promote harmonized education data collection, storage and information sharing mechanisms at all levels of education and training;
ii. Establish inclusive mechanisms to support confidentiality, integrity and availability of educational data across all levels;
iii. Promote and enforce the applicability of the collected digital data for improving teaching and learning across all levels;
iv. Promote learning analytics to improve teaching and learning outcomes at all levels of education and training; and
v. Develop ICT Disaster Recovery and Business Continuity Plan for data and information backup.

2.2.5 Security, Safety and Ethics

To implement a Strategy, the Government requires careful consideration of security, safety, and ethics to ensure accountability and responsible use of technology in education. The rapid development and widespread use of ICT, including the prevailing social networks and applications in emerging technologies, despite their benefits, have raised security, safety and ethical concerns, impacting the integration of ICT in education. The Government, in collaboration with education stakeholders, will adopt and implement the following strategies:

i. Ensure ICT curricula are integrated with security, safety, and ethics modules at all levels of education; and
ii. Ensure appropriate access and usage of ICT resources in education for each level.

2.2.6 Technical Support and Maintenance

For effective implementation of digital technologies in education, a technical support and maintenance team for each level of education should be established. Moreover, each educator needs to have training in simple troubleshooting procedures. Unlike universities, institutions that fall under basic education do not have technical and maintenance support teams. The Government, in collaboration with education stakeholders, will adopt and implement the following strategies:

i. Ensure budget allocation to support ICT infrastructure upgrades and maintenance;
ii. Ensure management of digital assets that supports ICT integration in education and training;
iii. Promote preventive maintenance to ensure operational life of digital equipment and systems.
iv. Establish inclusive ICT technical support centres for physical and virtual assistance on issues related to ICT integration in education at all levels;
v. Promote the use of technical support reporting system across all levels of education and training;
vi. Establish feedback mechanisms to gather input from users on their technical support needs and improve services accordingly;
vii. Foster peer ICT technical support centres' networks where educators and learners can share best practices for using and developing digital education tools; and
viii. Promote collaboration between education institutions and service providers to ensure ICT technical support.

3.0 Institutional Arrangements

There are institutional arrangements for the effective implementation of the Strategy as it requires a multi-sectoral approach in financing, management and coordination, as well as internal systems to strengthen the capacity at national and institutional levels. The management structure of education in Tanzania is mainly handled under two ministries, namely, the Ministry of Education, Science and Technology (MoEST) and the President's Office, Regional Administration and Local Government (PORALG). Both Ministries, in collaboration with Government and Non-Government institutions, shall be responsible to implement the Strategy.

Categorically, MoEST has the overall responsibility in the implementation of this Strategy and is generally responsible for policy formulation, planning, setting up guidelines, rules, and regulations, issuing circulars, undertaking monitoring and evaluation, as well as accreditation, supervision, and assurance of quality. It also oversees the provision of TVET, teacher education, higher education, and adult and non-formal education.

Specifically, PORALG oversees the delivery and attainment of targets set for pre-primary, primary and secondary education. These levels of education are coordinated nationally under the Division for Education Administration and mainly implemented through Local Governments Authorities.

3.1 National Digital Education Steering Committee

The National Steering Committee shall be established with membership drawn from MoEST, PO-RALG, and relevant stakeholders. The Committee will be led by the Permanent Secretary of the Ministry of Education, Science and Technology. The Committee shall comprise the following members:

a. The Permanent Secretary – MoEST,
b. The Permanent Secretary – PO RALG,
c. The Permanent Secretary – MICIT
d. The Permanent Secretary – MoF
e. The Permanent Secretary – MoE
f. Commissioner for Education – MoEST
g. Director of Education Administration (DEA)-PO – RALG
h. Director of Higher Education – MoEST
i. Director of Technical and Vocational Education – MoEST
j. Director of Science, Technology and Innovation – MoEST
k. Director of Basic Education – MoEST
l. Director of Quality Assurance – MoEST
m. Director of Policy and Planning – MoEST
n. Director of Policy and Planning – PO-RALG
o. Executive Director– HESLB
p. Director General – COSTECH
q. Executive Secretary –TCU
r. Executive Secretary – NACTVET
s. Director General – VETA
t. Executive Secretary – NECTA
u. Director General –TIE
v. Director General – TEA
w. Executive Director - TPSF
x. Executive Director - TAPIE

The National Steering Committee shall:

i. Lead the implementation process of the Strategy;
ii. Oversee the implementation of the Strategy;
iii. Spearhead partnership, resource mobilisation, and funding opportunities for implementation of the Strategy; and
iv. Evaluate the implementation progress of the Strategy quarterly.

3.2 National Digital Education Operations Committee

There shall be an established National Digital Education Operations Committee. The Committee shall be the secretariat to the National Steering Committee. The Committee will be chaired by the Director of Science and Technology in the Ministry of Education, Science and Technology. The members of the Committee

shall be:

i. Director of Science, Technology and Innovation – MoEST
ii. Director of Basic Education – MoEST
iii. Director of Education and administration - PO-RALG
iv. Director of Higher Education – MoEST
v. Director of Technical and Vocational Education – MoEST
vi. Managing Director – TANESCO
vii. Head of ICT Unit – MoEST
viii. Director of ICT– PO-RALG
ix. Director General – ICT Commission
x. Director General – TCRA
xi. Director General – UCSAF
xii. Director General – VETA
xiii. Director General – TEA
xiv. Director General – eGA
xv. Director General – REA
xvi. Director of ICT Development and Services – MICIT
xvii. Director of ICT Infrastructure – MICIT
xviii. Director of ICT– NECTA
xix. Director of ICT – COSTECH
xx. Executive Director – TAPIE
xxi. Head of ICT – TEA
xxii. Head of ICT – TCU
xxiii. Head of ICT – NACTVET
xxiv. Head of ICT – VETA
xxv. Head of ICT - TPSF

The responsibilities of the National Digital Education Operations Committee shall be to:

i. Prepare annual work plans on digital education and training activities for approval by the relevant Ministry or Heads of Institutions;
ii. Prepare budgetary matters and explore possible allocations and funding opportunities internally and externally;
iii. Provide framework, standards, guidelines and support for ICT integration in education and training in the organisation;
iv. Initiate, implement and propose a review of the national ICT integration in education and training policies, strategies and guidelines;
v. Conduct and coordinate research and development to expand the use of ICT in education and training;
vi. Co-ordinate ICT activities in education and training;
vii. Ensure implementation of systematic, comprehensive development and expansion of adequate ICT infrastructure;
viii. Ensure implementation of public and private sector investments in ICT in education and training;

ix. Implement ICT quality standards, guidelines and procedures, and conduct monitoring and evaluation for all ICT in education and training processes; and
x. Prepare annual reports on ICT in education and training activities and present them to the National ICT in Education Steering Committee.

3.3 Institutional Digital Education Committee

The specific Institutional Digital Education Committee shall be established at each institution of education in the country. The Committee shall be chaired by the Head of the Institution. Membership of the Committee shall be drawn from all departments in the institution. Where necessary, member(s) from outside the institution will be drawn.

The staff in charge of ICT in education and training at the institutional level shall be the secretary of the Institutional Digital Education Committee. The Institutional Digital Education Committee shall be responsible to:

i. Develop and review institutional ICT policy or strategies in line with the ICT in Education and Training Policy Framework and other existing ICT policies and regulations where applicable;
ii. Prepare annual work plans on digital education and training activities in the institution
iii. Prepare budgetary matters and externally and devise innovations to capture, plan and optimally use them;
iv. Develop, implement, monitor and evaluate ICT integration in education and training;
v. Coordinate ICT in education and training programmes in the institution.
vi. Spearhead resource mobilisation for ICT in education and training; and
vii. Submit reports annually on ICT in education and training activities in the institution on a need basis.


“There are Institutional arrangements for the effective implementation of the Strategy”

4.0 Sustainability Plan

There are dimensions of sustainability of the National Digital Education Strategy 2024. The sustainability dimensions in question include institutional, economic, social, technological, and environmental. Each dimension is scrutinised to ensure a harmonious integration of ICT in education that benefits present and future generations. Thus, the multifaceted aspects of sustainability for digital education and strategies to ensure its long-term practicability in the country are outlined as follows:

4.1 Institutional Sustainability

Institutional support and commitment are essential for the sustainable integration of ICT in education. Educational institutions can promote institutional sustainability by:

i. Integrating ICT into strategic planning processes to align technological initiatives with educational goals and objectives;
ii. Encouraging training on the use of digital facilities in education and training;
iii. Enforcing guidelines used in ICT integration in teaching and learning across all levels of education and training
iv. Enforcing mechanisms to maintain hardware and software in education and training institutions; and
v. Ensuring mechanisms for regular follow-up on the integration of ICT in education and training

4.2 Economic Sustainability

Economic sustainability in digital education evaluates the cost-effectiveness and financial viability of integrating technology into educational systems. It analyses the long-term economic implications of ICT adoption, considering factors like initial investment, maintenance costs, scalability, and resource optimization. Additionally, it explores strategies for funding ICT initiatives sustainably, fostering partnerships, and maximising return on investment in educational technology. Ensuring economic sustainability involves addressing the financial aspects associated with the use of ICT in education. Education institutions shall promote economic sustainability by:

i. Developing comprehensive financial plans that outline the costs associated with ICT adoption in education, including initial investments, maintenance, upgrades, and training;
ii. Ensuring cost-benefit analysis for effective digital education solutions;
iii. Developing sustainable funding models to support ongoing ICT infrastructure upgrades and maintenance;
iv. Fostering public-private partnerships to leverage resources and share costs;
v. Investing in comprehensive training and support programmes to empower educators and learners to maximise the value of ICT; and
vi. Ensuring monitoring and evaluation mechanisms to track the performance and impact of digital initiatives on education.

4.3 Social Sustainability

Social sustainability underscores the importance of fostering inclusive, equitable, and culturally responsive learning environments through ICT. Moreover, it addresses ethical considerations, digital citizenship, and the impact of ICT on interpersonal relationships, mental health, and well-being within educational settings. ICT integration should be inclusive and equitable, ensuring that all learners have access to technology-enabled educational opportunities. Education institutions shall promote social sustainability:

i. Bridging the digital divide by providing access to ICT resources and connectivity for underserved communities and marginalised groups;
ii. Fostering a culture of collaboration and knowledge sharing between institutions, parents and communities through online platforms and Community of Practice (CoP);
iii. Provide awareness and training for educators, learners and communities on topics such as online safety, information literacy, and digital citizenship to foster informed and ethical use of ICT; and
iv. Ensure that digital educational content is culturally relevant, representative, and inclusive to promote a sense of belonging and engagement among educators and learners in education.

4.4 Technological Sustainability

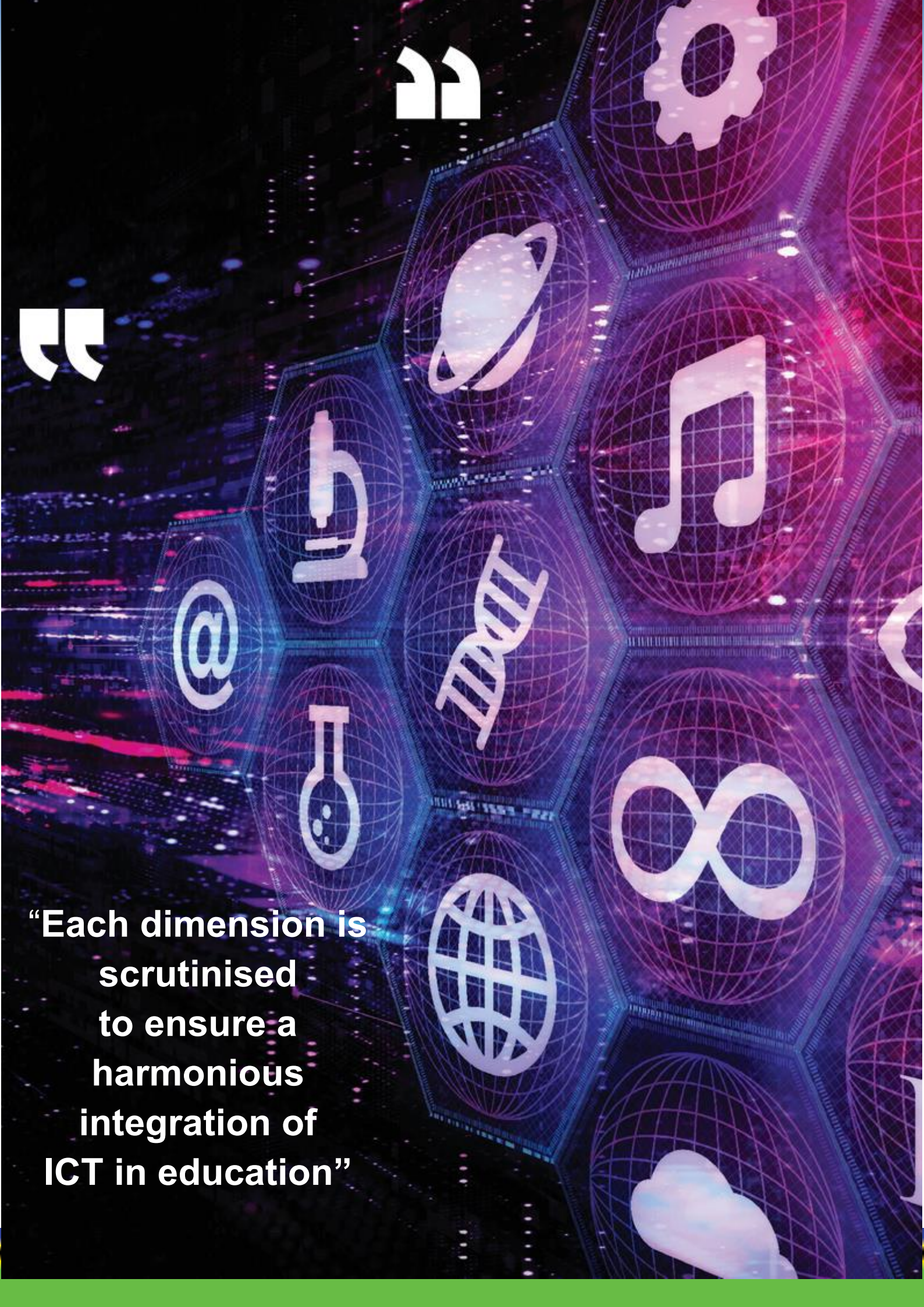
The technological sustainability aspect targets the durability (life span of tools, devices, systems), adaptability (compatibility with evolving educational needs), and accessibility of ICT solutions in education to all. Education institutions shall promote technological sustainability by:

i. Promoting investments in modular software platforms, cloud and AI–based infrastructure, and open-source technologies that allow for easy customization, expansion and cost effectiveness;
ii. Enforcing procurement policies and practices when acquiring ICT facilities for education and training purposes.

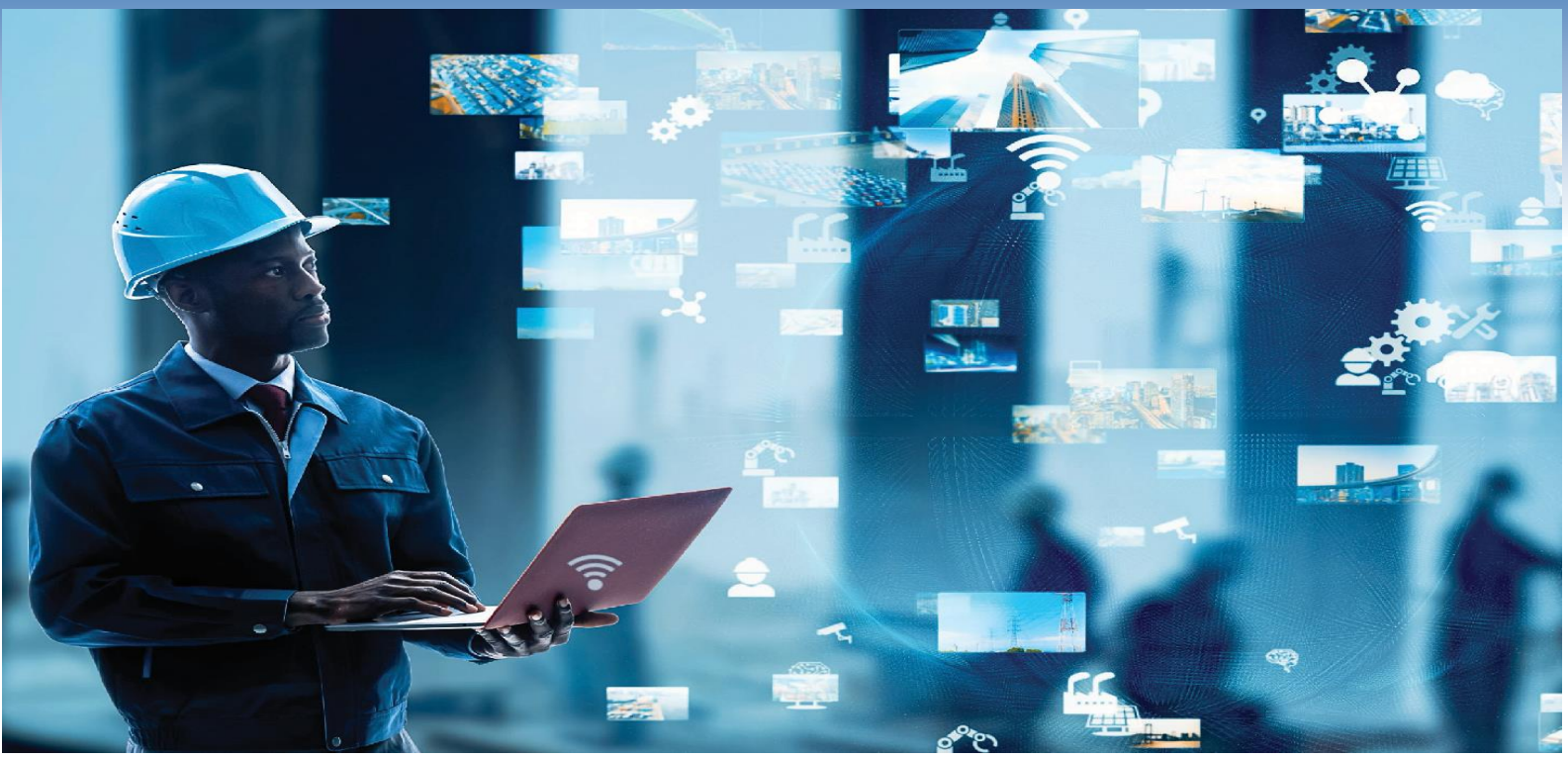
4.5 Environmental Sustainability

Environmental sustainability in digital education evaluates the ecological footprint of technological interventions in education and seeks to minimise their adverse environmental impacts. It focuses on strategies for reducing energy consumption by targeting renewable energy sources, promotes eco-friendly practices in hardware manufacturing and disposal of e-waste by targeting use of sustainable materials, and integrates environmental literacy into ICT curricula. It advocates for environmentally responsible practices throughout the lifecycle of educational technology. Education institutions shall promote environmental sustainability by:

i. Ensure the use of energy-efficient ICT infrastructure and devices to minimise energy consumption;
ii. Enforce policies responsible for e-waste management, including recycling and proper disposal of outdated devices; and
iii. Encourage the use of digital resources to reduce paper consumption and minimise the environmental impact of printing.



“Each dimension is scrutinised to ensure a harmonious integration of ICT in education”



5.0 Monitoring, Evaluation and Learning

Monitoring, Evaluation and Learning (ME&L) is critical in informing evidence-based decision-making. ME&L also forms a basis for continuous identification of gaps, lines for improvement, review process, and further research. ME&L will ensure that digital education strategies are implemented as planned and that emerging issues in ICT are promptly addressed. Although there exist several projects on ICT in the educational sector, few substantial monitoring and evaluation are leading to scarce reports on the integration of ICT in Education and Training. Therefore, it is important to monitor and evaluate the use of ICT in education.

The ME&L of ICT in education will be done at all levels of education and training through different approaches outlining milestones and key performance indicators under each strategic objective. The implementation of the strategy and its achievement will be monitored and evaluated throughout the implementation period of the strategy on a daily, quarterly, semi-annually and annual basis. Each education institution is responsible for implementing, monitoring and evaluating the implementation of the strategy and reporting the progress accordingly. The MoEST will play a key role in the coordination, implementation, monitoring and evaluation of this strategy.

A monitoring and evaluation framework will be developed as part of the Strategy implementation tool. The framework will involve the collection, compilation, synthesis, analysis and evaluation of information related to ICT in education. The information will be processed to compare the various baselines with actual implementation and findings will be disseminated to stakeholders. Effective monitoring will need a coordinated effort and close cooperation from all key players. To monitor, evaluate and report the progress in the use of ICT in education and training, the Government and stakeholders will implement the following strategies:

i. Develop a National ME & L framework to track, measure and evaluate progress made towards the use of ICT in education and training;
ii. Conduct ME & L of ICT in education and training in the institution;
iii. Enhance inclusive, gender-sensitive and evidence-based mechanisms for effective ME&L of digital education across all levels of education and training;
iv. Promote a multi-agency approach in undertaking ME&L of digital education;
v. Enhance the integration of ICT in education related data into EMIS for relevant decision-making; and
vi. Strengthen quality assurance mechanisms to ensure ICT integration and usage in education institutions.

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